Kong J, Kim K, Joung HJ, Chung CY, Park J.

In this study, we quantified changes in finger interdependence (enslaving), multi-finger synergies, and feedforward modulation of synergy properties (i.e., anticipatory synergy adjustment) during single- and multi-finger force production tasks in individuals with cerebral palsy (CP). Spastic diplegic CP and healthy control subjects performed sets of finger force production tasks by each of the hands, including maximal force production and submaximal quick pulse force production in an isometric condition. The framework of the uncontrolled manifold hypothesis was used to quantify the indices of multi-finger synergies and the anticipatory synergy adjustment (ASA). The CP group showed lower maximal forces and higher indices of finger interdependence (enslaving), while the indices of multi-finger synergies stabilizing total finger forces during stable force production were not different significantly compared to the controls. Further, the time of ASA for the CP group was not delayed. The CP group showed a significantly less drop in the synergy indices during the anticipatory and quick pulse phase compared to the control group, which was accompanied by larger co-contraction indices of the forearm muscles. These findings suggest that the function of assembling motor synergies for stable force production is not affected by CP, while the ability to modulate synergy properties may be impaired with CP partially due to spasticity. The spasticity presumably hampers the purposeful feedforward destabilization of the performance. The results suggest that quantification of multi-digit synergies may provide an alternative tool for quantitative assessment of impaired coordination in the CP individuals.

PMID: 31664488

2. Comparison of single event multilevel surgery and multiple surgical events in the lower extremities of children with spastic cerebral palsy.
Aslan A, Diril SK, Demirci D, Yorgancil H.

OBJECTIVES: This study aims to compare patients treated with single event multilevel surgery (SEMS) and multiple surgical events (MSE) for disorders of the lower extremities due to cerebral palsy (CP). PATIENTS AND METHODS: The study included 130 patients (74 males, 56 females; mean age 7.7±4 years; range, 4 to 13 years) who were retrospectively staged preoperatively and at the final follow-up with the Gross Motor Function Classification System (GMFCS). The patients were divided into two groups as group 1 (MSE) and group 2 (SEMS). Gross Motor Function Measure-88 (GMFM-88) was used as evaluation criteria and visual analog scale was used to measure family satisfaction. RESULTS: In the final follow-up, group 2 had better GMFM-88 D and E scores (p=0.037 and p=0.045, respectively). Similarly, family satisfaction was better in group 2 (p=0.047). There was a difference between preoperative and final follow-up GMFCS stages (I, II, III) of all patients.
(21±52÷56 and 53÷49÷28; respectively, p<0.001). A total of 3.8 (range, 2-7) operations were performed per child.

CONCLUSION: In this study, SEMS contributed significantly to movement, posture and independence of children with CP compared to MSE. Single event multilevel surgery also increased family satisfaction.

PMID: 31650917

3. Femoral and pelvic osteotomies for severe hip displacement in nonambulatory children with cerebral palsy: a prospective population-based study of 31 patients with 7 years' follow-up.
Terjesen T1.


Background and purpose - There is no consensus regarding the optimal treatment of hip displacement in children with cerebral palsy (CP). This prospective study assessed the outcome of femoral and pelvic osteotomies for severe hip displacement in nonambulatory children and analyzed prognostic factors for outcome.

Patients and methods - 31 nonambulatory children (20 boys), recruited from a population-based screening program, consecutively underwent unilateral (23) or bilateral (8) osteotomies and bilateral soft-tissue releases at a mean age of 6.1 years (2.2-9.9). The procedures were femoral varus osteotomy alone (20 hips) and combined Dega-type pelvic osteotomy and femoral osteotomy (19 hips). Final outcome was termed good if the patient had not undergone further bony surgery and migration percentage (MP) was < 50%. The mean follow-up time was 7.1 years (3.8-11). Results - The mean preoperative MP was 69% (36-100). The outcome was good in 22 patients (29 hips) and poor in 9 patients (10 hips). Mean time to failure was 3.6 years (1.0-6.0). GMFCS level V and high MP 1-year postoperatively were statistically significant risk factors for poor final outcome. There was a higher rate of good outcome after combined osteotomies compared with isolated femoral osteotomy, but the difference was not statistically significant (p = 0.2). Interpretation - Better primary correction was obtained after combined femoral and pelvic osteotomies than after isolated femoral osteotomy, indicating that combined osteotomies are the preferred method in hips with the most severe degrees of displacement. Prophylactic femoral osteotomy of the contralateral non-subluxated hip is hardly indicated.

PMID: 31674284

4. Salvage Treatment Options for Painful Hip Dislocations in Nonambulatory Cerebral Palsy Patients.
Shaw KA, Hire JM, Cearley DM.


Hip dislocation is a common occurrence in nonambulatory patients with cerebral palsy, occurring in up to 70% of patients. However, only 15% to 57% of chronic dislocations progress to become painful. In these patients, several salvage treatment options are available, including proximal femoral resection, subtrochanteric valgus osteotomy, hip arthrodesis, and prosthetic arthroplasty. Of the options, proximal femoral resection, subtrochanteric osteotomy, and prosthetic arthroplasty have been shown to provide reliable pain relief with improved sitting balance, with no evidence of one technique being superior to another. However, each technique has unique aspects to its postoperative care and potential complication profile that requires thorough understanding and communication with parents/caregivers when considering surgical intervention.

PMID: 31663909

5. [Modified Ilizarov hip reconstruction in treatment of adolescent hip instability].
Wu H, Liang X, Zhao W, Guo B, Ren L, Qin S, Chen J, Peng A, Yang H.


OBJECTIVE: To evaluate the effectiveness of modified Ilizarov hip reconstruction in the treatment of hip instability.

METHODS: The clinical data of 13 young patients with hip diseases treated with modified Ilizarov hip reconstruction between January 2010 and March 2018 were retrospectively analyzed. There were 2 males and 11 females, aged from 14 to 34 years, with an average age of 24.2 years. There were 1 case of hip dysplasia and dislocation due to spinal bifida, 3 cases of hip dysplasia after pyogenic arthritis of the hip, 2 cases of developmental dysplasia of the hip (DDH) accompanying femoral head...
necrosis who rejected hip replacement, 6 cases of young DDH refused to undergo hip replacement, and 1 case of bilateral hip dysplasia with dislocation due to spinal cord injury. The disease duration was 2-20 years, with an average of 8.5 years. Preoperative Trendelenburg sign was positive in 12 cases and negative in 1 case. The preoperative Harris score of hip joint was 53.5±8.9 and the unequal length of lower limbs was (46.08±15.73) mm. Postoperative Harris hip score and patients' satisfaction with effectiveness evaluated according to their self scoring were used to assess the effectiveness. RESULTS: All 13 patients were followed up 1-5 years, with an average of 2.6 years. Five patients developed postoperative needle infection, which improved after dressing change; 7 patients had limited knee joint activity and improved after knee joint function training. The Trendelenburg sign was negative at 1 year after operation, and the patient's hip pain symptoms were relieved or disappeared. The Harris hip score of patients at 1 year after operation was 84.5±6.1, which was significantly improved when compared with preoperative one (t=−10.538, P=0.000). According to Harris hip score, the effectiveness results were excellent in 4 cases, good in 5 cases, and fair in 4 cases, with an excellent and good rate of 69.2%. The unequal length of lower limbs was (15.38±7.27) mm, which was significantly better than that before operation (t=11.826, P=0.000). At last follow-up, the patients' satisfaction score was 80%-95%, with an average of 88%. CONCLUSION: Modified Ilizarov hip reconstruction can be used to treat young patients with hip disease who are unsuitable or refuse to undergo artificial hip replacement. Its effectiveness is reliable, and it has unique advantages in limb limp improvement and limb shortening correction.

PMID: 31650752


BACKGROUND: Hip dysplasia is common among children with cerebral palsy (CP), particularly in spastic CP. It can result in pain, reduced function and quality of life. However, the burden of hip dysplasia among children with CP in low-and middle-income countries (LMICs) like Bangladesh is unknown. We aimed to define the burden of hip dysplasia among children with spastic CP in Bangladesh. METHODS: This study includes a subset of the Bangladesh CP Register (BCPR) study cohort who were registered between January and March 2015. The BCPR is a population-based surveillance of children with CP (aged < 18 years) operating in a northern sub-district (Shahjadpur; child population ~226,114) of Bangladesh. Community-based key informant's method (KIM) survey conducted to identify children with CP in the surveillance area. A diagnosis of CP was made based on clinical history and examination by the study physicians and physiotherapist. Study participants had an antero-posterior (AP) X-ray of their pelvis. The degree of subluxation was assessed by calculating the migration percentage (MP). RESULTS: During the study period, 196 children with CP were registered, 144 had spastic CP. 40 children with spastic CP (80 hips) had pelvic X-Rays (mean age 9.4 years, range 4.0-18.0 years) and 32.5% were female. Gross Motor Function Classification System (GMFCS) showed 37.5% (n = 15) with GMFCS level I-II and 62.5% (n = 25) with GMFCS level III-V. Twenty percent (n = 8) of the children had hip subluxation (MP: 33-80%). Osteopenic changes were found in 42.5% (n = 17) children. CONCLUSIONS: To the best of our knowledge this is one of the first studies exploring hip dysplasia among children with CP. Our findings reflect that hip dysplasia is common among children with spastic CP. Introduction of hip surveillance programmes is imperative for prevention of secondary complications, reduced function and poor quality of life among these children.

PMID: 31656186

Corrado B, Di Luise C, Servidio Iammarrone C.


The purpose of this systematic review was to investigate the effectiveness of extracorporeal shockwave therapy for the management of muscle spasticity in children with cerebral palsy. An electronic database search was performed to identify studies relevant to the research question. Assessment of the quality of evidence in all relevant studies was performed with the help of the Oxford Center for Evidence-based Medicine guide. Four studies met our inclusion criteria for review: one was a low-quality randomized controlled clinical trial, two were individual case-control studies and one was a case series study. Reduction in muscle stiffness and improvement in joint range of motion were the outcomes in all of the selected studies that used extracorporeal shockwave therapy. However, considering the limited evidence provided by these studies, further research is needed to support the use of extracorporeal shockwave therapy in the management of muscle spasticity in children with cerebral palsy.

PMID: 31674272
Pierce SR, Kornafel T, Skorup J, Parembski AC, Prosser LA.

Purpose: The purpose of this research was to investigate differences in Early Clinical Assessment of Balance (ECAB) scores within children with cerebral palsy (CP) with different Gross Motor Function Classification System (GMFCS) levels and between children with CP and typical development (TD) who are under three years of age.

Methods: The ECAB was administered to fifty children (13 with TD, 16 with GMFCS level II, 11 with GMFCS level III, 10 with GMFCS level III).

Results: The group of children of TD had significantly higher scores than all groups of children with CP. There were significant differences in ECAB within the groups of children with CP with different GMFCS levels.

Conclusion: The results of this study support the construct validity of the ECAB as a measure of postural control in children under three years of age with CP.

PMID: 31661347

Sah AK, Balaji GK, Agrahara S.

PURPOSE: To examine the effects of task-oriented activities based on neurodevelopmental therapy (TOA-NDT) principles on trunk control, balance, and gross motor function in children with spastic diplegic cerebral palsy (SDCP). MATERIALS AND METHODS: Forty-four children with SDCP, aged 7-15 years, were recruited to participate in the randomized clinical trial. After random allocation, twenty-two (n = 22) children with SDCP participated in TOA-NDT principles and twenty-two (n = 22) in conventional physiotherapy (CPT) program. Each group underwent the treatment for a duration of 60min per day, 6 days a week for 6 weeks. Gross motor function measure-88 (GMFM-88), postural assessment scale (PAS), pediatric balance scale (PBS), and trunk impairment scale (TIS) were the outcome measures used to document the pre- and post-intervention effect.

RESULTS: The mean difference of GMFM-88, PAS, PBS, and TIS was 8.53 (5.84-11.23), 0.90 (5.84-11.23), 4.86 (2.93-6.79), and 1.45 (0.30-2.60), respectively. TOA-NDT group showed improvement in all the outcomes.

CONCLUSION: TOA-NDT principles are more beneficial in improving the trunk control, balance, and gross motor function parameters than CPT.

PMID: 31649770

Claridge EA, van den Berg-Emons RJG, Horemans HLD, van der Slot WMA, van der Stam N, Tang A, Timmons BW, Gorter JW, Bussmann JBJ.

BACKGROUND: Accurate measurement of physical behaviour is paramount to better understand lifestyle, health, and functioning, particularly in adults with physical disability as they may be at higher risk of sedentary lifestyle and subsequent negative health consequences. This study aimed: 1) to evaluate the criterion validity of a novel and clinically applicable activity monitor (AM, Activ8), in the detection of body postures and movements in adults with spastic cerebral palsy (CP); and 2) to evaluate the extent that the AM's positioning affects validity.

METHODS: In this cross-sectional study, 14 ambulatory adults with CP [9 men; mean (SD) age, 35.4 (13.1) years] performed standardized activities while wearing three Activ8 monitors - frontolateral thigh (primary position), frontal thigh, and pant pocket - and being video recorded (criterion measure). AM activity output was compared to synchronized video recordings. Absolute (seconds) and relative [(video time-AM time)/mean time, %] time differences between methods were calculated. Relative time differences of < 10% were indicative of good validity. Comparison of AM attachment positions was completed using Spearman Rho correlation coefficients and Meng's tests.

RESULTS: Criterion validity of the AM (frontolateral thigh) was good (average relative time differences: 0.25% for sitting, 4.69% for standing, 2.46% for walking, 1.96% for upright activity, 3.19% for cycling), except for running (34.6%). Spearman Rho correlation coefficients were greater between video/frontolateral thigh position than video/frontal thigh position and video/pant pocket position for body posture and movement categories sitting, standing, walking, and upright activity (p < 0.01 for all).

CONCLUSIONS: The AM, positioned on the frontolateral thigh, demonstrated good criterion validity in
ambulatory adults with CP. Though the Activ8 offers potential as an objective measure of physical activity, appropriate positioning is paramount for valid measurement.

PMID: 31665030

11. [Surgical treatment of limb deformity and disability: a statistical analysis of 35 075 cases from QIN Sihe orthopaedic team between May 25, 1978 and December 31, 2018].


OBJECTIVE: To investigate the characteristics and corrective strategies of various limb deformities treated by QIN Sihe orthopaedic team in the past 40 years, so as to provide a large sample for understanding the causes, types, and treatment methods of limb deformity and disability in China. METHODS: A clinical data of 35 075 cases who were treated by QIN Sihe orthopaedic team between May 1978 and December 2018 was summarized. The age, gender, deformity characteristics, etiological and pathological composition, regional distribution, and surgical methods of the patients were analyzed. RESULTS: There were 20 458 males (58.33%) and 14 617 females (41.67%). The age ranged from 1 to 82 years (mean, 20.5 years). The majority people (19 363 cases, 55.20%) were 11-25 years old. Of which, 33 259 cases (94.82%) were operated on lower extremity. The geographical distribution of patients covered 33 regions in China and 12 foreign countries. There were 202 etiologies involved neurological, heredity, metabolism, traumatic sequelae, congenital, vascular, lymphoid, skin, endocrine, iatrogenic, and so on. The disease covered all subsjects of orthopaedics. The top six deformities secondary to poliomyelitis sequelae, cerebral palsy, traumatic sequelae, spondylosis sequelae, genu varum and genu valgum, and congenital talipes equinovarus. There were 280 kinds of surgical methods, the majority of which were Achilles tendon lengthening, supracondylar osteotomy, subtalar joint arthrodesis, tibiofibular osteotomy, metatarsal aponeurosis, and Achilles tendon replacement of peroneal longus muscle, etc. Orthopaedic surgery combined with external fixation were applied in 8 702 cases, including Ilizarov fixator in 3 696 cases and Hybrid fixator in 5 006 cases. CONCLUSION: QIN Sihe orthopaedic database with 40 years is the largest one of limb deformity and disability in China. It reflects the etiology, type, population characteristics, surgical methods and strategy of limb disability and deformity which can be treated by orthopaedic surgery. The data needs to be further excavated and deeply studied in future because of its important academic value and historical significance.

PMID: 31650744

Chen ZY, Wu ZY, An YH, Dong LF, He J, Chen R.


BACKGROUND: Cavovarus foot is a common form of foot deformity in children, which is clinically characterized by an abnormal increase of the longitudinal arch of the foot, and it can be simultaneously complicated with forefoot pronation and varus, rearfoot varus, Achilles tendon contracture, or cock-up toe deformity. Muscle force imbalance is the primary cause of such deformity. Many diseases can lead to muscle force imbalance, such as tethered cord syndrome, cerebral palsy, Charcot-Marie-Tooth disease, and trauma. At present, many surgical treatments are available for cavovarus foot. For older children, priority should be given to midfoot osteotomy and fusion. Since complications such as abnormal foot length, foot stiffness, and abnormal gait tend to develop postoperatively, it is important to preserve the joints and correct the deformity as much as possible. Adequate soft tissue release and muscle balance are the keys to correcting the deformity and avoiding its postoperative recurrence. AIM: To assess the efficacy of soft tissue release combined with joint-sparing osteotomy in the treatment of cavovarus foot deformity in older children. METHODS: The clinical data of 21 older children with cavovarus foot deformity (28 feet) who were treated surgically at the Ninth Department of Orthopedics of Jizhong Energy Xingtai Mining Group General Hospital from November 2014 to July 2017 were retrospectively analyzed. The patients ranged in age from 10 to 14 years old, with an average age of 12.46 ± 1.20 years. Their main clinical manifestations were deformity, pain, and gait abnormality. The patients underwent magnetic resonance imaging of the lumbar spine, electromyographic examination, weight-bearing anteroposterior and lateral X-rays of the feet, and the Coleman block test. Surgical procedures including metatarsal fascia release, Achilles tendon or medial gastrocnemius lengthening, "V"-shaped osteotomy on the dorsal side of the metatarsal base, opening medial cuneiform wedge osteotomy, closing cuboid osteotomy, anterior transfer of the posterior tibial tendon, peroneus longus-to-brevis transfer, and calcaneal sliding osteotomy to correct hindfoot varus deformity were performed. After surgery, long leg plaster casts were applied, the plaster casts were removed 6 wk later, Kirschner wires were removed, and
functional exercise was initiated. The patients began weight-bearing walk 3 mo after surgery. Therapeutic effects were evaluated using the Wicart grading system, and Meary's angles and Hibbs' angles were measured based on X-ray images obtained preoperatively and at last follow-up to assess their changes. RESULTS: The patients were followed for 6 to 32 mo, with an average follow-up period of 17.68 ± 6.290 mo. Bone healing at the osteotomy site was achieved at 3 mo in all cases. According to the Wicart grading system, very good results were achieved in 18 feet, good in 7, and fair in 3, with a very good/good rate of 89.3%. At last follow-up, mean Meary's angle was 6.36° ± 1.810°, and mean Hibbs' angle was 160.21° ± 4.167°, both of which were significantly improved compared with preoperative values (24.11° ± 2.948° and 135.86° ± 5.345°, respectively; P < 0.001 for both). No complications such as infection, skin necrosis, or bone nonunion occurred. CONCLUSION: Soft tissue release combined with joint-sparing osteotomy has appreciated efficacy in the treatment of cavovarus foot deformity in older children.

PMID: 31667171

13. Proteasome inhibition preserves longitudinal growth of denervated muscle and prevents neonatal neuromuscular contractures.
Nikolaou S, Cramer AA, Hu L, Goh Q, Millay DP, Cornwall R.


Muscle contractures are a prominent and disabling feature of many neuromuscular disorders, including the two most common forms of childhood neurologic dysfunction: neonatal brachial plexus injury (NBPI) and cerebral palsy (CP). There are currently no treatment strategies to directly alter the contracture pathology, as the pathogenesis of these contractures is unknown. We previously showed in a mouse model of NBPI that contractures result from impaired longitudinal muscle growth. Current presumed explanations for growth impairment in contractures focus on the dysregulation of muscle stem cells (MuSCs), which differentiate and fuse to existing myofibers during growth, as this process has classically been thought to control muscle growth during the neonatal period. Here, we demonstrate in a mouse model of NBPI that denervation does not prevent myonuclear accretion and that reduction of myonuclear number has no effect on functional muscle length or contracture development, providing definitive evidence that altered myonuclear accretion is not a driver of neuromuscular contractures. In contrast, we observed elevated levels of protein degradation in NBPI muscle, and we demonstrate that contractures can be pharmacologically prevented with the proteasome inhibitor, bortezomib. These studies provide the first strategy to prevent neuromuscular contractures by correcting the underlying deficit in longitudinal muscle growth.

PMID: 31661460

14. Energy intake during the acute phase and changes in femoral muscle thickness in older hemiplegic inpatients with stroke.


OBJECTIVE: The purpose of this study was to clarify the relationship between changes in lower limb muscle mass and energy intake during the acute phase in older hemiplegic inpatients with stroke. METHODS: A prospective cohort study was performed in 157 consecutive older patients with stroke. Patients were categorized into two groups of energy sufficiency/non-sufficiency based on their daily energy intake during the first week after admission, and compared with regard to change in femur muscle thickness (ΔFMT) between admission and after the four-week period in paralysis/non-paralysis limbs. FMT was determined using B-mode ultrasound imaging with an 8-MHz transducer. RESULTS: The study included 42 men and 54 women (mean age 81 T 6 y). At one week after admission, 57 patients were classified into the energy sufficiency group, and 39 were in the energy shortage group. ΔFMT in each group: -3.7 ± 5.1 mm in the paralysis/sufficiency group, -5.2 ± 5.2 mm in the paralysis/shortage group, -3.9 ± 3.9 mm in the non-paralysis/sufficiency group and -1.5 ± 3.9 mm in the non-paralysis/shortage group. No significant difference was observed in the ΔFMT between the sufficiency group and the non-sufficiency group in the paralysis limb (P = 0.159); a significant difference was observed in the non-paralysis limb (P = 0.002). The multivariate regression analysis showed that energy sufficiency were independently associated with ΔFMT in the non-paralysis limb (unadjusted coefficient = 1.592; 95% confidence interval = 0.072 to 3.112, P = 0.040). CONCLUSIONS: Energy intake could affect ΔFMT on the non-paralysis side in older stroke inpatients.

PMID: 31655467
15. The Vojta approach changes thicknesses of abdominal muscles and gait in children with spastic cerebral palsy: A randomized controlled trial, pilot study.
Sung YH, Ha SY.

BACKGROUND: Children with cerebral palsy (CP) have abnormal postures and gait patterns. Many physiotherapists use the Vojta approach as intervention for children with CP. However, its effects remain unclear. OBJECTIVE: This study aimed to investigate the effect of the Vojta approach on abdominal muscles and gait in children with spastic CP. METHODS: Thirteen children with spastic CP were randomly assigned to a general exercise and a Vojta approach group. The interventions were administered in 30 min sessions, 3 times a week for a total of 6 weeks. We used ultrasonography to measure the thicknesses of the abdominal muscles. The gait and foot pressure were measured by GAITRite. RESULTS: The Vojta approach group showed significant difference in the thicknesses of the rectus abdominis, and external oblique abdominal muscles, which are involved in trunk stability (p< 0.05). There were significant differences in the step width, functional ambulation profile, swing time, stance time, and single support % of cycle as well as foot pressure distribution (p< 0.05). CONCLUSION: The Vojta approach may be considered as an effective treatment method for improving trunk stability and gait functions of children with spastic CP.

PMID: 31658070

Whitney DG, Caird MS, Jepsen KJ, Kamdar NS, Marsack-Topolewski CN, Hurvitz EA, Peterson MD.

BACKGROUND: Fracture is a high-burden condition that accelerates unhealthful aging and represents a considerable economic burden. Adults with neurodevelopmental disabilities (NDDs) may be susceptible for fracture at younger ages compared to adults without NDDs; and yet, very little is known about the burden of fracture for these underserved populations. The purpose of this study was to determine the sex-stratified prevalence of all-cause fracture among adults with NDDs, as compared to adults without NDDs, and if comorbidity of NDDs is associated with greater risk of fracture. METHODS: Data from 2016 were extracted from Optum Clinformatics® Data Mart (private insurance) and a random 20% sample from Medicare fee-for-service (public insurance). ICD-10-CM diagnosis codes were used to identify adults with NDDs, including intellectual disabilities, autism spectrum disorders, and cerebral palsy. Age-standardized prevalence of any fracture and fracture by anatomical location was compared between adults with and without NDDs, and then for adults with 1 NDD vs. 2 and 3 NDDs. RESULTS: Adults with intellectual disabilities (n = 69,456), autism spectrum disorders (n = 21,844), and cerebral palsy (n = 29,255) had a higher prevalence of any fracture compared to adults without NDDs (n = 8.7 million). For women, it was 8.3%, 8.1%, and 8.5% vs. 3.5%, respectively. For men, it was 6.6%, 5.9%, and 6.7% vs. 3.0%, respectively. Women with NDDs had a higher prevalence of fracture of the head/neck, thoracic, lumbar/pelvis, upper extremities, and lower extremities compared to women without NDDs. A similar pattern was observed for men, except for no difference for lumbar/pelvis for all NDDs and thoracic for autism spectrum disorders. For women and men, increasing comorbidity of NDDs was associated with a higher prevalence of any fracture: 1 NDD (women, 7.7%; men, 5.7%); 2 NDDs (women, 9.4%; men, 7.2%); all 3 NDDs (women, 11.3%; men, 13.7%). CONCLUSIONS: Study findings suggest that adults with NDDs have an elevated prevalence of fracture compared to adults without NDDs, with the fracture risk being higher with greater numbers of comorbid NDD conditions for most anatomical locations. Our study findings indicate a need for earlier screening and preventive services for musculoskeletal frailty for adults with NDDs.

PMID: 31655219

Withers JW, Muzzolon SB, Zonta MB.

OBJECTIVE: To describe the influence of adapted hip-hop dancing on the quality of life (QoL) and biopsychosocial profile of children/adolescents with cerebral palsy (CP). METHODS: Pilot study including 18 children/adolescents with CP and Gross Motor Function Classification System levels I and II. Nine participants took part in an adapted hip-hop dance practice (study
group; SG), and nine others served as the control group (CG). All participants were assessed with the Pediatric Outcomes Data Collection Instrument and the Child Behavior Checklist at baseline and after at least three months of dance practice and a public performance (SG) or a similar period without intervention (CG). RESULTS: Improvement in QoL was observed in the SG in the domains of transfer and basic mobility (p = 0.00*), sporting and physical function (p = 0.04*), and global function and symptoms (p = 0.01*). In the SG, there was a reduction in emotional and behavioral problems and an increase in social competence in the biopsychosocial profile. Greater participation in adapted hip-hop dancing was associated with a greater gain in the transfer and basic mobility domains (p = 0.05*) of the Pediatric Outcomes Data Collection Instrument and in the activities (p = 0.05*) and social (p = 0.04*) scales of the Child Behavior Checklist. CONCLUSIONS: Children/adolescents with CP participating in adapted hip-hop dance practice showed improvement in QoL and biopsychosocial profile scores.

PMID: 31664347

Aran OT, Şahin S, Köse B, Ağce ZB, Kayihan H.


Cerebral palsy is a term covering non-progressive motor and cognitive impairments caused by lesions of the brain. This study aims to evaluate the effectiveness of virtual reality-based rehabilitation program for children with hemiplegic cerebral palsy on cognitive functions. Ninety children (47 boys, 43 girls) with hemiplegic cerebral palsy were randomized to either study (n = 45; 11.18 ± 3.37 years) or control (n = 45; 11.06 ± 3.24 years) groups. The study group received virtual reality intervention in addition to Traditional Occupational Therapy intervention, and the control group received Traditional Occupational Therapy for 20 sessions. Both groups were evaluated by blinded assessors with Dynamic Occupational Therapy Cognitive Assessment for Children to collect information on cognitive functioning. Both groups' cognitive functions were improved after 10 weeks of interventions. The between-group comparison revealed significantly greater improvements in all subtest of cognitive functions in the virtual reality group than in the Traditional Occupational Therapy group (P < 0.001). Our results showed that 10 weeks of virtual reality-based rehabilitation enhanced cognitive functions in children with hemiplegic cerebral palsy. Using virtual reality applications in cognitive rehabilitation was recommended to improve spatial perception, praxis, visuomotor construction and thinking operations in children with cerebral palsy.

PMID: 31658111

Warnier N, Lambregts S, Port IV.


Aim: To investigate the effect of Virtual Reality Therapy (VRT) on balance and walking in children with cerebral palsy (CP).Method: A systematic search in Pubmed and Embase was performed until the 9th of July 2019. Articles were included if the population consisted of children with CP and data on balance and/or walking were reported. Results were pooled in two meta-analyses.Results: 26 articles were included. For ‘balance’ 5 and for ‘walking’ 4 were used for the meta-analyses. The meta-analyses showed a significant result in favor of VRT for balance, SMD 0.89 [95% CI, SD 0.14, 1.63] and for walking, SMD 3.10 [95% CI, SD 0.78, 5.35].Interpretation: VRT seems a promising intervention for rehabilitation in children with CP. The meta-analysis confirmed this positive effect. These results must be interpreted with caution due to differences in the interventions used, the lack of randomized-controlled trials, and the relatively small groups.

PMID: 31674852

Wu J, Loprinzi PD, Ren Z.


This research aims to evaluate the effect of virtual reality (VR) games on balance recovery of children with cerebral palsy (CP)
by quantitatively synthesizing the existing literature, and to further determine the impact of VR game intervention (the duration of each intervention, intervention frequency, intervention cycle, and total intervention time) on the balance recovery of children with CP. To this end, relevant literature up until 3 August 2019 was retrieved from Chinese databases (CNKI and Wanfang Data) and the databases in other languages (Web of Science, Pubmed, EBSCOHost, Informit, Scopus, Science Direct, and ProQuest), and bias analysis was conducted with the PEDro scale in this research. Randomized controlled trials (RCTs) were selected and underwent meta-analysis, and combined effect size was calculated with a random effects model. The results showed that VR games may improve the balance of children with CP (Hedge's g = 0.29; 95% CI 0.10-0.48), and no significant influence of the intervention on balance of children with CP was shown in the subgroup analysis. In conclusion, VR games played a positive role in the improvement of balance of children with CP, but these results should be viewed with caution owing to current methodological defects (difference in measurement, heterogeneity of control groups, intervention combined with other treatments, etc.).

PMID: 31661938

Aguayo V, Arias VB, Verdugo MÁ, Amor AM.


BACKGROUND: It is unknown whether the Supports Intensity Scale-Children's version (SIS-C) is valid and useful to assess support needs for children with motor and intellectual disabilities. AIDS: (a) To assess the structural validity of the SIS-C using factor analyses in a sample of children with motor disabilities; and (b) to analyze the SIS-C's reliability and its discriminative capacity in children with different levels of motor function. METHODS AND PROCEDURES: A cross-sectional design was used to assess 210 children (aged 5-16 years). Among them, 88% had an intellectual disability and 84% had cerebral palsy, with variations in mobility (Gross Motor Function Classification System; level V: 56.19%), handling of objects (Manual Ability Classification System; level V: 38.09%), and communicating (Communication Function Classification System; level V: 42.86%). OUTCOMES AND RESULTS: The model with seven support needs factors and three method factors showed the best fit. The support needs model was reliable and indicated high convergent validity. However, the SIS-C scores showed a strong ceiling effect in children with more significant limitations in gross and fine motor functions. CONCLUSIONS AND IMPLICATIONS: The seven-dimensional model of support needs could be replicated in children with motor disabilities. However, the usefulness of SIS-C is limited in discriminating between children with greater restrictions in mobility and handling of objects.

PMID: 31675653

Reina R, Iturricastillo A, Castillo D, Urban T, Yanci J.


Classification is a hot topic in Paralympic sport, making the development of evidence-based and sport-specific classification systems mandatory. However, the development of sports-specific measurement is a considerable scientific challenge in team Paralympic sports such as 7-side football (i.e. CP-Football). The aims of this study were, 1) to describe the activity limitation and external match load (ML) differences among impairment profiles (FT) in international level footballers with cerebral palsy (CPFP), and 2) to analyse the relationship among the activity limitation and external ML variables. Forty-eight international male CPFP (23±7 yr; 174.7±7.2 cm; 69.4±9.2 kg; 22.7±2.6 kg·m⁻² ) participated in this study and were divided according to their impairment profile (FT5/6, FT7, and FT8). Significant differences (p < 0.05) have been observed among FT profiles in the activity limitation tests (i.e., static balance, coordination, vertical jump, horizontal jump, acceleration capacity and change of direction ability (CODA)). Additionally, significant differences have been observed among FT profiles in certain ML values (i.e. Velmax , High Acc and in Mod and High Dec), where generally, FT8 players reported the best performance values. On the other hand, especially in the FT5/6 and in the FT8 profiles, a large-to-very large significant relationship was observed between the CPFP activity limitation and the ML values. In general, the results of the present study show that players with a lower impairment have less activity limitation and better ML. This study concludes that the potential relationships between the impairments of hypertonia, ataxia or athetosis and performance in this para-sport might be impairment-specific.

PMID: 31657483
23. The reliability and validity of the Timed Up and Go as a clinical tool in individuals with and without disabilities across a lifespan: a systematic review.
Christopher A, Kraft E, Olenick H, Kiesling R, Doty A.


Purpose: To summarize the available literature related to reliability and validity of the Timed Up and Go in typical adults and children, and individuals diagnosed with the following pathologies: Huntington's disease, stroke, multiple sclerosis, Parkinson's disease, spinal cord injury, Down syndrome, or cerebral palsy. Materials and methods: A search was conducted using MeSH terms and keywords through a variety of databases. Data regarding reliability and validity were synthesized. Results: This review included 77 articles. Results were variable depending on the studied population. The Timed Up and Go showed excellent reliability in typical adults, in individuals with cerebral palsy, in individuals with multiple sclerosis, in individuals with Huntington's disease, individuals with a stroke, and individuals with a spinal cord injury. The TUG demonstrated strong concurrent validity for individuals with stroke and spinal cord injury. Predictive validity data was limited. Conclusions: Based on the literature assessed, the Timed Up and Go is clinically applicable and reliable across multiple populations. The Timed Up and Go has a wide variety of clinical use making it a diverse measure that should be considered when choosing an outcome or activity based outcome measure. However, there are some limitations in the validity of the utilization of the Timed Up and Go to some populations due to a lack of data and/or poor choice of comparison outcome measures when assessing validity. Additional research is needed for young to middle aged adults. IMPLICATIONS FOR REHABILITATION Outcome measures are a vital component of clinical practice across all populations. The Timed Up and Go is a highly studied outcome measure in the geriatric population, but lacks research of its applicability to other populations. This study was able to highlight the clinical utility of the Timed Up and Go in populations that under utilize this outcome measure.

PMID: 31656104

Frank M, Keels MA, Quiñonez R, Roberts M, Divaris K.


Purpose: Currently, caries risk assessment tools consider all children with special health care needs in tandem. The purpose of this study was to test this assumption by examining caries risk among and within five distinct groups of children, most with special health care needs (CSHCN): (1) autism (ASD); (2) congenital heart disease (CHD); (3) cerebral palsy (CP); (4) Down syndrome (DS); and (5) a control (non-CSHCN) group. Methods: A retrospective longitudinal cohort of 150 patients (30 per group) from a private pediatric dental practice was assembled, and information on caries diagnoses and 21 postulated caries risk factors from clinical records was extracted. Bivariate tests and multivariable Poisson regression modeling were used to estimate the caries incidence rate (IR), ratio (IRR), and 95 percent confidence interval (CI). Results: CSHCN had a higher caries burden and caries risk (IR equals 0.049 per person per year) compared to the control group (IR equals 0.033). Caries risk was nearly double among CHD (IRR equals 1.9 [95 percent CI equals 0.72 to 5.2] versus controls) compared to DS (IRR equals 1.04 [95 percent CI equals 0.38 to 2.9]). Visible cavities or fillings was the only significant risk factor, yet it did not alter the between-CSHCN group (i.e., CHD greater than DS, controls) caries risk heterogeneity. Conclusions: Children with special health care needs comprise a heterogeneous group that must be treated in a precise, diagnosis-specific manner in caries risk assessment. Caries experience in the primary dentition was the only significant predictor of permanent dentition caries incidence. (Pediatr Dent 2019;41(5):378-84).

PMID: 31648669


Background: Drooling is an involuntary loss of saliva from the mouth, and it is a common problem for children with cerebral palsy (CP). The treatment may be pharmacological, surgical, or speech-related. Repeated Muscle Vibration (rMV) is a proprioceptive impulse that activates fibers Ia reaching the somatosensory and motor cortex. Aim: The aim of the study is to evaluate the effectiveness of rMV in the treatment of drooling in CP. Design, setting and population: This was a rater blinded prospective feasibility study, performed at the "Gli Angeli di Padre Pio" Foundation, Rehabilitation Centers (Foggia, Italy),
involving twenty-two CP patients affected by drooling (aged 5-15, mean 9.28 ± 3.62). Children were evaluated at baseline (T0), 10 days (T1), 1 month (T2) and 3 months (T3) after the treatment. Methods: The degree and impact of drooling was assessed by using the Drooling Impact Scale (DIS), the Drooling Frequency and Severity Scale (DFSS), Visual Analogue Scale (VAS) and Drooling Quotient (DQ). An rMV stimulus under the chin symphysis was applied with a 30 min protocol for 3 consecutive days. Results: The statistical analysis shows that DIS, DFSS, VAS, DQ improved with significant differences in the multiple comparisons between T1 vs T2, T1 vs T3 and T1 vs T4 (p<0.001). Conclusion This study demonstrates that rMV might be a safe and effective tool in reducing drooling in patients with CP. The vibrations can improve the swallowing mechanisms and favor the acquisition of the maturity of the oral motor control in children with CP.

PMID: 31673235

Jahan I, Muhit M, Hardianto D, Karim T, Al Imam MH, Das MC, Smithers-Sheedy H, Badawi N, Khandaker G.


Aim: To assess the burden and underlying factors of malnutrition among children with cerebral palsy (CP) in the remote Sumba Island, Indonesia. Methods: This is a community-based key informant (KI) method survey of children with CP in the southwest regency of Sumba Island, Indonesia (child population~152 471). Children with suspected CP identified by trained community volunteers (KIs) underwent a detailed neurodevelopmental assessment by a multidisciplinary medical assessment team to confirm diagnosis of CP. Anthropometric measurements were taken, z scores were calculated, and nutritional status was determined following the World Health Organization guideline. Descriptive analyses were performed, multivariable linear regression model was fitted to identify potential predictors of malnutrition. Results: One hundred and thirty children with CP aged <18 years were included in the study. The majority were severely underweight (78.8%) and severely stunted (85.9%). Severe malnutrition was overrepresented among young children, children who had spastic tri/quadriplegia, Gross Motor Function Classification System levels III-V, had at least one associated impairment, speech impairment and/or swallowing difficulties. Age and presence of visual impairment were found to be significantly associated with weight-for-age z score (i.e., underweight) whereas, epilepsy was significantly associated with the height-for-age z score (i.e., stunting) when adjusted for other covariates. Conclusions: The substantial-high burden of malnutrition among children with CP in remote Sumba Island highlights their vulnerability to poor health-related outcomes. There is an urgent need for nutritional rehabilitation services to avert such consequences among children with CP in low and middle-income countries like Indonesia. Implications for rehabilitation Malnutrition among children with cerebral palsy (CP) is alarmingly high in the remote Sumba island of Indonesia. Children with severe gross motor function limitations or spastic tri/quadriplegia had the most severe malnutrition. There is an urgent need for rehabilitation services including nutrition and feeding interventions for children with CP in low and middle-income countries like Indonesia.

PMID: 31656105

27. Comment on "dose, timing and source of protein intake of young people with cerebral palsy".
Wijnen C, Schröder D.


PMID: 31651203

28. Assessment of Anxiety and Depression in Polish Primary Parental Caregivers of Children with Cerebral Palsy Compared to a Control Group, as well as Identification of Selected Predictors.


BACKGROUND: Taking care of a child with Cerebral Palsy (CP) may be linked with adverse effects in the parents' physical and mental health. The causes of anxiety and depression symptoms associated with childcare are still not fully understood. AIM: To assess the intensity of anxiety and depression symptoms in parents of children with CP compared to a control group and to identify selected mental health predictors. DESIGN AND METHODS: Data were collected from 301 respondents,
including 190 parents of children with CP (study group) and 111 parents taking care of children developing normally (control group). Intensity of anxiety and depression was rated using the Hospital Anxiety and Depression Scale (HADS) scale. Gross Motor Function Classification System for Cerebral Palsy (GMFCS), Sense of Coherence Scale (SOC-29), Berlin Support Social Scales (BSSS) scales and a specially designed questionnaire were used to assess the predictors. The investigated variables included the children's and the parents' characteristics, as well as environmental factors. The analyses applied Spearman's rank correlation coefficient, M(SD) as well as multiple regression. RESULTS: The level of anxiety and depression was clearly higher in the parents of children with CP-the mean levels of anxiety and depression in the study group and the controls amounted to 8.1 vs. 4.7 and 6.8 vs. 3.7, respectively. The factors associated with intensity of anxiety and depression in the parents of children with CP included lack of social support, mainly perceived and received support, unsatisfying parental health status, poor economic status of the family, as well as difficult living conditions, sense of coherence, loneliness, the parent's gender, and the child's intellectual disability. CONCLUSIONS: Identification of significant anxiety and depression predictors, understood as modifiable factors, should be considered in determining and planning comprehensive support for a child with CP and his/her primary parental caregiver.

PMID: 31671833


BACKGROUND: Caregivers of children with cerebral palsy (CP) face unique demands and challenges, with potential negative impact on psychological wellbeing and consequences for both caregiver and child. Timely support could improve parental wellbeing. AIM: To evaluate the effectiveness of interventions aimed at improving the psychological wellbeing of caregivers of children with CP. METHODS AND PROCEDURES: Systematic review and meta-analysis of randomised controlled trials of interventions to improve the psychological well-being of caregivers of children with cerebral palsy. Databases (including MEDLINE, EMBASE, PsycINFO, Cochrane) were searched for relevant English language publications between January 1990 and December 2017. Risk of bias was assessed including randomization, allocation concealment, incomplete outcome data and selective outcome reporting. OUTCOME AND RESULTS: We included 13 studies (1293 participants, 1/3 with CP). Six studies investigated a positive parenting intervention; the other seven studies covered a range of other interventions. Meta-analysis of 7 studies (662 participants) showed that interventions significantly improved parental wellbeing (standardised mean difference -0.61, 95% CI -0.92 to -0.30, z = 3.84, p = 0.0001). CONCLUSIONS AND IMPLICATIONS: Limitations include small sample sizes and heterogeneity in study design; however, our results indicate that interventions can improve the wellbeing of parents of children with CP and should be made available.

PMID: 31670025

30. Neurodevelopmental outcome predictors of term newborns with neonatal seizures.
Martins R, Coelho J, Dos Santos TP, Moreno T, Quintas S, Levy A.

Rev Neurol. 2019 Nov 1;69(9):370-376. doi: 10.33588/rn.6909.2019209. [Article in English, Spanish; Abstract available in Spanish from the publisher]

INTRODUCTION: The concrete burden of neonatal seizures in neurodevelopmental outcome of term newborns is still unknown in literature. The aim of this study was to describe prognostic predictors in neonatal seizures. SUBJECTS AND METHODS: Observational prospective study of term neonates with clinical seizures from a tertiary center (2009-2018). Adverse outcome was determined as death, global developmental delay, cerebral palsy or epilepsy. Perinatal characteristics, etiology, electrographic features, neuroimaging and antiepileptic treatment were analyzed in a logistic regression model. RESULTS: A total of 102 newborns were included (52 infants with normal outcome). Twelve fatalities were registered. In the survival group, 38 children had an adverse outcome (28 global developmental delay, 27 cerebral palsy, 21 epilepsy). From the prognostic variables identified in univariate analysis, perinatal complications, seizure onset in the first day of life, moderate to severe abnormal background activity, abnormal amplitude-integrated EEG pattern, and treatment response remained independently associated with adverse outcome after a logistic regression model. CONCLUSIONS: There is conflicting data about surrogate markers in neonatal seizures. Aside from confirming the predictive value of previously described variables, we observed that amplitude-integrated EEG monitoring is a forthcoming prognostic tool. Future approaches may include a wider use of amplitude-integrated EEG monitoring, being crucial for timely seizure identification and prompt treatment.

PMID: 31657449
31. The Palliative Use of Intrathecal Baclofen in Niemann-Pick Disease Type C.
Ubeda Tikkanen A, Buxton K, Ullrich CK, Stone SS, Nimec DL.

Niemann-Pick disease type C is a rare progressive genetic disorder that leads to the abnormal accumulation of lipids within various tissues of the body, including brain tissue and liver. There is a rapid progression of the disease, resulting in severe disability in only a few years after the first symptoms, and survival is not much longer. Spasticity, dystonia, and chronic pain are common findings that severely impact quality of life in these patients. Analgesic management with traditional pain medications is not always effective, and the risk for secondary effects in medically complex patients is high. Liver function is also a limiting factor in these patients. This is a case report of a boy with advanced Niemann-Pick disease type C with developmental regression, cataplexia, and seizures. His severe spasticity made positioning and care difficult, and intense pain required multiple hospitalizations. He had unsuccessfully trialed multiple drugs. An intrathecal baclofen pump was placed without surgical complications and resulted in positive clinical effects. Baclofen pumps have classically been used for spasticity management in adults and children with nonprogressive diseases such as cerebral palsy or spinal cord injury with relatively long life expectancies. In adults, they have been used in patients with multiple sclerosis; however, use in pediatric neurodegenerative diseases has scarcely been reported. The use of intrathecal baclofen in palliative settings might provide an additional resource to provide comfort and quality of life for children with neurodegenerative diseases not only at end-of-life stages but also earlier on.

PMID: 31649137

32. Effect of acupuncture combined with repetitive transcranial magnetic stimulation on motor function and cerebral hemodynamics in children with spastic cerebral palsy with spleen-kidney deficiency.
Ji YH, Ji YH, Sun BD.

OBJECTIVE: To investigate the clinical effect of acupuncture combined with repetitive transcranial magnetic stimulation in the treatment of children with spastic cerebral palsy with spleen-kidney deficiency, as well as its effect in improving cerebral hemodynamics. METHODS: A total of 220 children with spastic cerebral palsy were divided into observation group and control group using a random number table, with 110 children in each group. The children in the control group were given rehabilitation training and repetitive transcranial magnetic stimulation, and those in the observation group were given acupuncture in addition to the treatment in the control group. Acupuncture was performed at Zusanli (ST36), Xuanzhong (GB39), Sanyinjiao (SP6), Pishu (BL20), Shenshu (BL23), Qihai (CV6), Neiguan (PC6), Hegu (LI4) and Tianshu (ST25) once every other day, three times a week for 3 consecutive months. The two groups were compared in terms of Gross Motor Function Measure (GMFM), Fine Motor Function Measure (FMFM), comprehensive function score for children with cerebral palsy, clinical outcome, and related cerebral hemodynamic parameters (mean blood flow velocity [Vm], systolic peak velocity [Vs], and resistance index [RI] of the cerebral artery). RESULTS: After treatment, both groups had significant increases in the scores of GMFM, FMFM and comprehensive function (cognitive function, speech function, motor ability, self-care, and social adaptability, P<0.01), and the observation group had significantly better improvements in the scores of GMFM (domains A, B and C), FMFM (domains B, C, D and E), and comprehensive function than those of the control group (P<0.01). The therapeutic effect of the observation group (93/110, 84.55%) was superior to that of the control group (80/110, 72.73%, P<0.05). The observation group had significantly higher Vs and Vm and a significantly lower RI than the control group (P<0.01). CONCLUSION: In the treatment of children with spasmodic cerebral palsy with spleen-kidney deficiency, acupuncture combined with repeated transcranial magnetic stimulation can significantly improve their motor function, comprehensive function, and clinical outcome, which may be associated with the regulation of cerebral hemodynamics.

PMID: 31657167

33. The continuing evolution of "Cerebral Palsy".
Rosenbaum PL, Dan B.

PMID: 31669162
34. Including hope in the treatment scheme-paradigms in the management of patients with cerebral palsy.
Pădureț IA.

PMID: 31664182

Prevention and Cure

35. Role of XIAP gene overexpressed bone marrow mesenchymal stem cells in the treatment of cerebral injury in rats with cerebral palsy.


BACKGROUND: This study is performed to investigate the effects of adenovirus-mediated X-linked inhibitor of apoptosis protein (XIAP) overexpressed bone marrow mesenchymal stem cells (BMSCs) on brain injury in rats with cerebral palsy (CP).
METHODS: Rat's BMSCs were cultured and identified. The XIAP gene of BMSCs was modified by adenovirus expression vector Ad-XIAP-GFP. The rat model of CP with ischemia and anoxia was established by ligating the left common carotid artery and anoxia for 2 h, and BMSCs were intracerebroventricularly injected to the modeled rats. The mRNA and protein expression of XIAP in brain tissue of rats in each group was detected by RT-qPCR and western blot analysis. The neurobehavioral situation, content of acetylcholine (Ach), activity of acetylcholinesterase (AchE), brain pathological injury, apoptosis of brain nerve cells and the activation of astrocytes in CP rats were determined via a series of assays.
RESULTS: Rats with CP exhibited obvious abnormalities, increased Ach content, decreased AchE activity, obvious pathological damage, increased brain nerve cell apoptosis, as well as elevated activation of astrocyte. XIAP overexpressed BMSCs improved the neurobehavioral situation, decreased Ach content and increased AchE activity, attenuated brain pathological injury, inhibited apoptosis of brain nerve cells and the activation of astrocytes in CP rats.
CONCLUSION: Our study demonstrates that XIAP overexpressed BMSCs can inhibit the apoptosis of brain nerve cells and the activation of astrocytes, increase AchE activity, and inhibit Ach content, so as to lower the CP caused by cerebral ischemia and hypoxia in rats.
PMID: 31660045

36. Intrapartum cardiotocograph monitoring and perinatal outcomes for women at risk: Literature review.
Small KA, Sidebotham M, Fenwick J, Gamble J.


PROBLEM: Caesarean section rates have risen in high-income countries. One of the potential drivers for this is the widespread use of CTG monitoring. BACKGROUND: Intrapartum cardiotocograph monitoring is considered to be indicated for women at risk for poor perinatal outcome. AIM: This systematic literature review with meta-analysis examined randomised controlled trials and non-experimental research to determine whether cardiotocograph monitoring rather than intermittent auscultation during labour was associated with changes in perinatal mortality or cerebral palsy rates for high-risk women. METHODS: A systematic search for research published up to 2019 was conducted using PubMed, CINAHL, Cochrane, and Web of Science databases. Non-experimental and randomised controlled trial research in populations of women at risk which compared intrapartum cardiotocography with intermittent auscultation and reported on stillbirth, neonatal mortality, perinatal mortality and/or cerebral palsy were included. Relative risks were calculated from extracted data, and meta-analysis of randomised controlled trials was undertaken. FINDINGS: Nine randomised controlled trials and 26 non-experimental studies were included. Meta-analysis of pooled data from RCTs in mixed- and high-risk populations found no statistically significant differences in perinatal mortality rates. The majority of non-experimental research was at critical risk of bias and should not be relied on to inform practice. Cardiotocograph monitoring during preterm labour was associated with a higher incidence of cerebral palsy. DISCUSSION: Research evidence failed to demonstrate perinatal benefits from intrapartum cardiotocograph monitoring for women at risk for poor perinatal outcome. CONCLUSION: There is an urgent need for well-designed research to consider whether intrapartum cardiotocograph monitoring provides benefits.
PMID: 31668871