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Interventions and Management

1. Effects of auditovisual feedback on eye-hand coordination in children with cerebral palsy.
Alwhaibi R, Alsakhawi R, ElKholi S.

Res Dev Disabil. 2020 Apr 5;101:103635. doi: 10.1016/j.ridd.2020.103635. [Epub ahead of print]

BACKGROUND: Children with spastic hemiplegic cerebral palsy have deficits in eye-hand coordination. This limits manual actions performed with the affected hand, especially fine motor skills such as grasping and manipulation. Visual-motor integration, grasping skills, and visual perception are collectively involved in eye-hand coordination. AIMS: We investigated the effects of augmented biofeedback training on eye-hand coordination in children with spastic hemiplegic cerebral palsy. METHODS AND PROCEDURES: Forty-five spastic hemiplegic cerebral palsy children (5-8 years old) were included. Children were assigned randomly into three equal groups. One group received traditional physical therapy to facilitate visual-motor integration and grasping skills for 3 months. The second group received augmented biofeedback training. The third group received a combination of augmented biofeedback training and traditional physical therapy. Children were evaluated with the Peabody Developmental Motor Scale (2nd edition) (PDMS-2). Treatment sessions were conducted for 60 min, three times a week, for 3 consecutive months. OUTCOMES AND RESULTS: Children that received augmented biofeedback training alongside traditional physical therapy had significantly improved scores in the Visual-Motor Integration and grasping subtests compared to children that received only one intervention. CONCLUSIONS AND IMPLICATIONS: Augmented biofeedback training alongside physical therapy improved eye-hand coordination in children with spastic hemiplegic cerebral palsy.

PMID: 32268257

2. IncobotulinumtoxinA for the treatment of spasticity in children with cerebral palsy - a retrospective case series focusing on dosing and tolerability.
León-Valenzuela A, Palacios JS, Del Pino Algarrada R.

BMC Neurol. 2020 Apr 8;20(1):126. doi: 10.1186/s12883-020-01702-7.

BACKGROUND: IncobotulinumtoxinA (Xeomin®) is a botulinum neurotoxin type A with established efficacy in the treatment of upper-limb spasticity in adults. This retrospective case series in a university hospital setting aimed to elucidate the safety and tolerability of incobotulinumtoxinA for treatment of spasticity in children with cerebral palsy. METHODS: Participants received incobotulinumtoxinA injections up to a maximum total dose of 600 U, 24 U/kg body weight. Medical records were reviewed for key demographic information, incobotulinumtoxinA exposure, and adverse effects (AEs). RESULTS: Sixty-nine children were included (mean age [SD], 8.3 [3.9] years; 44/69 [63.8%] male). One-hundred-and-ninety -one injections were administered, with mean (SD) of 2.8 (1.5) treatment cycles/participant and dosing interval of 6.0 (1.7) months. The number of muscles injected increased from 2.4 (1.2) at cycle 1 to 4.2 (1.9) at cycle 6. The mean (SD) total

incobotulinumtoxinA dose increased from 191.7 (126.2) U, (8.5 [5.4] U/kg body weight) at cycle 1 to 368.0 (170.1) U, (9.9 [5.5] U/kg body weight) at cycle 6. Seventy four adverse effects (37.5% of injections) were reported, the most frequent was injection pain (93.2% of AEs). Only three AEs were considered directly treatment-related by injectors: muscle weakness, generalized weakness, and fever. CONCLUSIONS: Our clinical experience indicates that incobotulinumtoxinA is a well-tolerated treatment option for focal spasticity in children with cerebral palsy. TRIAL REGISTRATION: As the study was observational and retrospective, no EudraCT registration number was requested. The internal code assigned to the study in the administrative resolution was: 1143-N-15.

PMID: 32268880

3. Outcome of Centralization and Ulnarization of the Carpus with Ulnar Shortening Osteotomy on Functioning in Children with Radial Club Hand.

Das SP, Ganesh GS.

Indian J Orthop. 2020 Feb 6;54(1):87-96. doi: 10.1007/s43465-019-00019-z. eCollection 2020 Feb.

BACKGROUND: Radial club hand (RCH) is characterized by a wide array of hand and forearm anomalies. Various treatment approaches have been described depending upon the stages of RCH. The major drawback of these studies is that the effectiveness of these interventions was reported on clinical and radiological outcomes. With the increasing focus on patient-centered care nowadays, we wanted to identify the components associated with functioning and evaluate the effectiveness of two surgical procedures on functional outcomes using the International Classification of Functioning, Disability and Health (ICF)-based tools. MATERIALS AND METHODS: We identified 14 children from our records (nine boys, five girls) with a mean age of 5.6 years, classified as Bayne types III-IV and classified them into two groups; those who were operated by centralization (group 1) and ulnarization of the carpus with ulnar shortening osteotomy procedure (group 2). The outcomes were evaluated by the brief ICF core set for the child and youth with cerebral palsy up to the age of 5 and the brief ICF core set for hand conditions for a period of 1 year after surgery. RESULTS: The results showed that both the operative techniques showed improvement in the structure component (s730-structure of upper extremity). ICF categories of d445-hand and arm use, d530-toileting, and d880-engagement in play showed a change in frequencies of more than 40% after surgery and were maintained till follow-up. However, categories related to muscle power functions (b730), muscle tone (b735), fine hand use (d440), hand and arm use (d445) and engagement in play (d880) showed no significant improvement (p > 0.05). There were no differences between both the surgical procedures in improving the outcomes (p > 0.05). CONCLUSION: We conclude that surgical techniques may be more appropriate to improve the cosmetic or structural appearance of the upper extremity than functioning.

PMID: 32257021

4. Endoscopic Transverse Gastrocsoleus Recession in Children With Cerebral Palsy.

Kim DW, Kim HW, Yoon JY, Rhee I, Oh MK, Park KB.

Front Pediatr. 2020 Mar 24;8:112. doi: 10.3389/fped.2020.00112. eCollection 2020.

Aim: The aim of this study was to evaluate the surgical outcome, in terms of gait improvement, of endoscopic transverse Vulpius gastrocsoleus recession in children with cerebral palsy compared to the traditional open surgery. Methods: Twenty-seven children with cerebral palsy who had undergone endoscopic transverse Vulpius gastrocsoleus recession were reviewed. For the comparison of gait improvement, independent ambulatory spastic diplegic patients who had undergone only endoscopic transverse Vulpius gastrocsoleus recession on both legs were selected. Seven (14 legs) children were included and the median age was 7 years (6-9 years). Seven age-matched patients with the same inclusion/exclusion criteria who underwent open surgery were selected as the control group. Physical examination and gait parameters were evaluated and compared between groups, including the gait deviation index (GDI), and gait profile score (GPS). Results: There was no significant complication in twenty-seven children after endoscopic transverse Vulpius gastrocsoleus recession. However, one patient required a revision open surgery at postoperative 1 year 9 months due to the recurrence of equinus and the incomplete division of the midline raphe which was noted during surgery. When comparing gait improvements, there were no differences between the endoscopic and open surgery groups in ankle dorsiflexion angle, ankle kinetics, GDI, and GPS. The postoperative peak ankle dorsiflexion during stance phase was slightly higher in the open group. Conclusion: This is the first study that evaluates gait improvement exclusively for children with spastic diplegia after endoscopic transverse Vulpius gastrocsoleus recession. The gait improvements after endoscopic surgery were comparable to the open surgery, however, the possibility of reduced improvement in ankle kinematics should be considered.

PMID: 32266190

5. Altered Motoneuron Properties Contribute to Motor Deficits in a Rabbit Hypoxia-Ischemia Model of Cerebral Palsy.
Steele PR, Cavarsan CF, Dowaliby L, Westefeld M, Katenka N, Drobyshevsky A, Gorassini MA, Quinlan KA.

Front Cell Neurosci. 2020 Mar 25;14:69. doi: 10.3389/fncel.2020.00069. eCollection 2020.

Cerebral palsy (CP) is caused by a variety of factors attributed to early brain damage, resulting in permanently impaired motor control, marked by weakness and muscle stiffness. To find out if altered physiology of spinal motoneurons (MNs) could contribute to movement deficits, we performed whole-cell patch-clamp in neonatal rabbit spinal cord slices after developmental injury at 79% gestation. After preterm hypoxia-ischemia (HI), rabbits are born with motor deficits consistent with a spastic phenotype including hypertonia and hyperreflexia. There is a range in severity, thus kits are classified as severely affected, mildly affected, or unaffected based on modified Ashworth scores and other behavioral tests. At postnatal day (P)0-5, we recorded electrophysiological parameters of 40 MNs in transverse spinal cord slices using whole-cell patch-clamp. We found significant differences between groups (severe, mild, unaffected and sham control MNs). Severe HI MNs showed more sustained firing patterns, depolarized resting membrane potential, and fired action potentials at a higher frequency. These properties could contribute to muscle stiffness, a hallmark of spastic CP. Interestingly altered persistent inward currents (PICs) and morphology in severe HI MNs would dampen excitability (depolarized PIC onset and increased dendritic length). In summary, changes we observed in spinal MN physiology likely contribute to the severity of the phenotype, and therapeutic strategies for CP could target the excitability of spinal MNs.

PMID: 32269513

6. Robot-assisted gait training using a very small-sized Hybrid Assistive Limb® for pediatric cerebral palsy: A case report.
Kuroda M, Nakagawa S, Mutsuzaki H, Mataki Y, Yoshikawa K, Takahashi K, Nakayama T, Iwasaki N.

Brain Dev. 2020 Apr 2. pii: S0387-7604(19)30717-X. doi: 10.1016/j.braindev.2019.12.009. [Epub ahead of print]

PURPOSE: Gait parameters and gross motor function improve after 12 sessions of small-sized Hybrid Assistive Limb® (S-HAL) training in adult cerebral palsy (CP) patients. However, there are no reports on repetitive robot-assisted gait training using the newly developed very small-sized HAL (2S-HAL). This study aimed to examine the effect of using 2S-HAL on a pediatric CP patient. METHODS: The subject was an 11-year-old boy (height = 138 cm, weight = 30 kg) with spastic quadriplegia due to periventricular leukomalacia, with Gross Motor Function Classification System level IV. HAL training was performed for 2-4 sessions/week for 20 min/session (i.e., 4-week period with 12 sessions). Outcome measures were walking ability, gross motor function, Canadian Occupational Performance Measure (COPM), and Pediatric Evaluation of Disability Inventory measured before, after, and at 1, 2, and 3 months after HAL-assisted gait training. RESULTS: After HAL intervention, gait speed, step length, cadence, 6-min walking distance (6MD), Gross Motor Function Measure (GMFM), and COPM increased and physiological cost index (PCI) declined compared to those before intervention. The peaks of gait speed, step length, and cadence were 2 month, 1 month, and 3 month, respectively. 6MD, PCI, and GMFM at 1-3 months post-intervention were maintained. COPM peaked at 1 month post-intervention but remained higher than that before intervention. CONCLUSION: This is the first report of repetitive intervention using 2S-HAL in a pediatric CP patient. Gait training using 2S-HAL may be effective in CP patients as it improves post-training walking ability and gross motor function.

PMID: 32249081

7. "Paralympic Brain". Compensation and Reorganization of a Damaged Human Brain with Intensive Physical Training.
Nakazawa K, Obata H, Nozaki D, Uehara S, Celnik P.

Sports (Basel). 2020 Apr 7;8(4). pii: E46. doi: 10.3390/sports8040046.

The main aim of the study was to evaluate how the brain of a Paralympic athlete with severe disability due to cerebral palsy has reorganized after continuous training geared to enhance performance. Both corticospinal excitability of upper-limb muscles and electromyographic activity during swimming were investigated for a Paralympic gold medalist in swimming competitions. Transcranial magnetic stimulation (TMS) to the affected and intact hand motor cortical area revealed that the affected side finger muscle cortical representation area shifted towards the temporal side, and cortico-spinal excitability of the target muscle was prominently facilitated, i.e., the maximum motor evoked potential in the affected side, 6.11 ± 0.19 mV was greater than that in the intact side, 4.52 ± 0.39 mV (mean $\pm$ standard error). Electromyographic activities during swimming demonstrated well-coordinated patterns as compared with rather spastic activities observed in the affected side during walking on land. These results suggest that the ability of the brain to reorganize through intensive training in Paralympic athletes can teach interesting lessons to the field neurorehabilitation.

PMID: 32272591

8. Bone health in pediatric patients with neurological disorders.
Ko A, Kong J, Samadov F, Mukhamedov A, Kim YM, Lee YJ, Nam SO.

Ann Pediatr Endocrinol Metab. 2020 Mar;25(1):15-23. doi: 10.6065/apem.2020.25.1.15. Epub 2020 Mar 31.

Patients with neurological disorders are at high risk of developing osteoporosis, as they possess multiple risk factors leading to low bone mineral density. Such factors include inactivity, decreased exposure to sunlight, poor nutrition, and the use of medication or treatment that can cause lower bone mineral density such as antiepileptic drugs, ketogenic diet, and glucocorticoids. In this article, mechanisms involved in altered bone health in children with neurological disorders and management for patients with epilepsy, cerebral palsy, and Duchenne muscular dystrophy regarding bone health are reviewed.

PMID: 32252212

9. Equine-Assisted Intervention to Improve Perceived Value of Everyday Occupations and Quality of Life in People with Lifelong Neurological Disorders: A Prospective Controlled Study.
Pálsdóttir AM, Gudmundsson M, Grahn P.

Int J Environ Res Public Health. 2020 Apr 3;17(7). pii: E2431. doi: 10.3390/ijerph17072431.

People with neurological disorders suffer from poor mobility, poor balance, fatigue, isolation and monotonous everyday activities. Studies show that equine-assisted interventions can improve their mobility and balance, but could these kinds of interventions also increase participants' activity repertoire and self-assessed health, and reduce their fatigue? The study was conducted as a prospective, controlled study with three cohorts followed for one year: intervention group (n = 14), control group Passive (n = 29), and control group Active (n = 147). Participants in the study were affected by neurological disease or injury that limited their opportunities for an active everyday life. The intervention group lacked regular activities outside the home before the intervention, which consisted of riding once a week, led by a certified therapist. Control group Passive lacked regular activities outside the home, while control group Active had several activities outside the home per week. Primary outcome measures were activity repertoire measured with Occupational Value Assessment questionnaire. Secondary outcome measures were global self-assessed health measured with EuroQol-VAS and fatigue measured with Shirom-Melamed Burnout Questionnaire. The intervention group's activity repertoire and self-assessed health increased significantly compared to both baseline and the control groups. Equine-assisted interventions could help to improve the perceived value of everyday occupations and quality of life, as well as break isolation and increase the activity repertoire of people with neurological disorders.

PMID: 32260047

10. Predictors of Leisure Participation in 6 to 14-Year-Old Children with Cerebral Palsy: Structural Equation Modeling.

Ghaffari S, Kalantari M, Rezaee M, Akbarzadeh Baghban A.

OBJECTIVE: The aim of this study was to test a model of child, family and environment and identify factors affecting the intensity of leisure participation by children with cerebral palsy (CP). MATERIALS & METHODS: In this cross-sectional study, 232 children with cerebral palsy (141 boys and 91 girls), aged 6 to 14 years old and their parents were selected from four schools of children with special needs and five rehabilitation centers through the convenience sampling method in Shiraz, Iran. To evaluate the intensity of leisure participation, we used the Persian version of Children's Assessment of Participation and Enjoyment (CAPE) completed by the participants. Demographic form, Craig Hospital Inventory of Environmental Factors (CHIEF), Strengths and Difficulties Questionnaire (SDQ), Family Environmental Scale (FES), SPARCLE cognitive level and parents' version of Gross Motor Function Classification System, Manual Ability Classification System and Communication Function Classification System were sent to the parents with some necessary explanations. Structural equation modeling was used to test the model hypothesis. SPSS version 18 and AMOS version 16 were used for data analysis. RESULTS: Comparative fit indexes indicated a moderate to good model fit. The presented model explained 44% of the variance in the intensity of participation. Constructs such as Family Activity Orientation with standardized total effect of 0.31 and path coefficients of P< .05 showed the most significant direct effect on participation, followed by higher gross motor function (-.26), higher manual ability (-.19), communication function (-.17), higher cognitive level (-.16), more siblings in the family (.15) and less emotional-behavioral problems (-.15). Family structures and relationships (.17) and unsupportive environment constructs (-.14) demonstrated an indirect but significant effect (P< .05). The relationship of family education level and income with participation was not significant (P>.05). CONCLUSION: The intensity of CP children's participation is influenced by child, family and environmental factors. Parents' knowledge of recreational activities and their preference to participate in leisure and recreational activities provide children more opportunities to participate. Higher gross motor function, manual ability, and communication function also play an important role in their participation. Family structure means family cohesion, roles organization, and conflicts between family members and encountering physical, attitudinal and structural barriers at home and community indirectly impact children's participation pattern. To enhance children's participation, we suggest therapists to support children's behaviors, family relationships and involvement in community activities and optimize physical function of children with limitations in self-mobility.

PMID: 32256623

11. Extending Delivery Coverage to Include Prenatal Care for Low-Income, Immigrant Women Is a Cost-Effective Strategy.

Rodriguez MI, Swartz JJ, Lawrence D, Caughey AB.

OBJECTIVE: To compare the outcomes and cost effectiveness of two alternate policy strategies for prenatal care among low-income, immigrant women: coverage for delivery only (the federal standard) and prenatal care with delivery coverage (state option under the Children's Health Insurance Program). METHODS: A decision-analytic model was developed to determine the cost effectiveness of two alternate policies for pregnancy coverage. All states currently provide coverage for delivery, and 19 states also provide coverage for prenatal care. An estimated 84,000 unauthorized immigrant women have pregnancies where no prenatal care is covered. Our outcomes were costs, quality-adjusted life-years, and cases of cerebral palsy and infant death before age 1. Model inputs were obtained from a database of Oregon Medicaid claims and the literature. Univariate and bivariate sensitivity analyses, as well as a Monte Carlo simulation, were performed. RESULTS: Extending prenatal coverage is a cost-effective strategy. Providing prenatal care for the 84,000 women annually who are currently uninsured could prevent 117 infant deaths and 34 cases of cerebral palsy. Prenatal care coverage costs $380 more per woman than covering the delivery only. For every 865 additional women receiving prenatal care, one infant death would be averted, at an average cost of $328,700. Cost-effectiveness acceptability curve analyses suggest a 99% probability that providing prenatal care is more cost effective at a willingness to pay threshold of $100,000 per quality-adjusted life-year. CONCLUSIONS: Extending prenatal care to low-income immigrant women, regardless of citizenship status, is a cost-effective strategy.

PMID: 32253056

12. Temporal and spatial localization of general movement complexity and variation - why Gestalt assessment requires experience.

Wu YC, van Rijssen IM, Buurman MT, Dijkstra LJ, Hamer EG, Hadders-Algra M.

AIM: General movements assessment (GMA), based on Gestalt perception, identifies infants at risk of cerebral palsy. However, the requirement of ample experience to construct the assessor's inner criteria for abnormal movement hampers its widespread clinical use. This study aims to describe details of general movements (GMs) in various body parts and to investigate their association with GMA-Gestalt. METHODS: Participants were 24 typically developing infants and 22 very-high-risk infants. GMs were assessed during the writhing (0-8 weeks) and/or fidgety GM-phase (2-5 months) by GMA-Gestalt and a semi-quantification of the duration of simple movements and complex movements in various body parts. RESULTS: During both GM-phases, the quality of movement often varied within a single assessment, but the degree of complexity and variation of movements in trunk, arms, and legs were interrelated (ρ=0.32-0.84). Longer durations of complex movements in arms and legs (p<0.042) were further associated with a better quality in GMA-Gestalt. Head movement was associated with movements in other body parts only in the writhing phase and not associated with GMA-Gestalt during both GM-phases. CONCLUSION: Infants did not show consistently over time and across body parts simple or complex movements. Detailed description of movement characteristics may facilitate the development of computer-based GMA.

PMID: 32274828

13. Establishing an early identification score system for cerebral palsy based on detailed assessment of general movements.
Wang Y, Zhu P, Yang Z, Gu G.

PMID: 32252569

14. Network Implementation of Guideline for Early Detection Decreases Age at Cerebral Palsy Diagnosis.
Maitre NL, Burton VJ, Duncan AF, Iyer S, Ostrander B, Winter S, Ayala L, Burkhardt S, Gerner G, Getachew R, Jiang K, Lesher L, Perez CM, Moore-Clingenpeel M, Lam R, Lewandowski DJ, Byrne R.

BACKGROUND AND OBJECTIVES: Early diagnosis of cerebral palsy (CP) is critical in obtaining evidence-based interventions when plasticity is greatest. In 2017, international guidelines for early detection of CP were published on the basis of a systematic review of evidence. Our study aim was to reduce the age at CP diagnosis throughout a network of 5 diverse US high-risk infant follow-up programs through consistent implementation of these guidelines. METHODS: The study leveraged plan-do-study-act and Lean methodologies. The primary outcome was age at CP diagnosis. Data were acquired during the corresponding 9-month baseline and quarterly throughout study. Balancing measures were clinic no-show rates and parent perception of the diagnosis visit. Clinic teams conducted strengths, weaknesses, opportunities, and threats analyses, process flow evaluations, standardized assessments training, and parent questionnaires. Performance of a 3- to 4-month clinic visit was a critical process step because it included a Hammersmith Infant Neurologic Examination, a General Movements Assessment, and standardized assessments of motor function. RESULTS: The age at CP diagnosis decreased from a weighted average of 19.5 (95% confidence interval 16.2 to 22.8) to 9.5 months (95% confidence interval 4.5 to 14.6), with P = .008; 3- to 4-month visits per site increased from the median (interquartile range) 14 (5.2-73.7) to 54 (34.5-152.0), with P < .001; and no-show rates were not different. Parent questionnaires revealed positive provider perception with improvement opportunities for information content and understandability. CONCLUSIONS: Large-scale implementation of international guidelines for early detection of CP is feasible in diverse high-risk infant follow-up clinics. The initiative was received positively by families and without adversely affecting clinic operational flow. Additional parent support and education are necessary.

PMID: 32269135

15. The usefulness of MRI Classification System (MRICS) in a cerebral palsy cohort.
Nagy E, Herbert Z, Péter I, Csorba E, Skobrák A, Farkas N, Hollódy K.

AIM: Our aim was to investigate perinatal and clinical factors associated with children with cerebral palsy (CP) using magnetic resonance imaging (MRI). The distribution of MRI patterns was based on the MRI Classification System (MRICS). Associations between perinatal/clinical characteristics and MRI patterns were also investigated. METHODS: A population-based cohort study was performed, those 257 children (58.0% male) were enrolled from our CP database who born between 1990-2015 in Southwest Hungary and had at least one MRI scan. RESULTS: Brain maldevelopments were found in 18.7% of our patients, 83.7% of those born at term. Grey matter lesions were found in 19.8% of our patients and 80.0% of those children were born at term. The rate of white matter injuries was the highest (35.4%); 69.0% of these patients were born before 37th week of gestation. MRI revealed no abnormalities in 13.6% of children with CP. The best values of gross/fine motor and cognitive function tests were found in children with normal MRI and with grey matter injuries. The prevalence of epilepsy was above 60% in every group with an abnormal MRI. CONCLUSION: MRI results were conclusive in 86.4% of children with CP. It is highly encouraged to perform cranial MRI in every patient with CP.

PMID: 32246856

16. Cardiotocograph-based labor stage classification from uterine contraction pressure during ante-partum and intra-partum period: a fuzzy theoretic approach.
Das S, Obaidullah SM, Santosh KC, Roy K, Saha CK.

Computerized techniques for Cardiotocograph (CTG) based labor stage classification would support obstetrician for advance CTG analysis and would improve their predictive power for fetal heart rate (FHR) monitoring. Intrapartum fetal monitoring is necessary as it can detect the event, which ultimately leads to hypoxic ischemic encephalopathy, cerebral palsy or even fetal demise. To bridge this gap, in this paper, we propose an automated decision support system that will help the obstetrician identify the status of the fetus during ante-partum and intra-partum period. The proposed algorithm takes 30 min of 275 Cardiotocograph data and applies a fuzzy-rule based approach for identification and classification of labor from 'toco' signal. Since there is no gold standard to validate the outcome of the proposed algorithm, the authors used various statistical means to establish the cogency of the proposed algorithm and the degree of agreement with visual estimation were using Bland-Altman plot, Fleiss kappa (0.918 ± 0.0164 at 95% CI) and Kendall's coefficient of concordance ($W = 0.845$). Proposed method was also compared against some standard machine learning classifiers like SVM, Random Forest and Naïve Bayes using weighted kappa (0.909), Bland-Altman plot (Limits of Agreement 0.094 to 0.0155 at 95% CI) and AUC-ROC (0.938). The proposed algorithm was found to be as efficient as visual estimation compared to the standard machine learning algorithms and thus can be incorporated into the automated decision support system.

PMID: 32257127

17. Perioperative fetal hemodynamic changes in twin-twin transfusion syndrome and neurodevelopmental outcome at two-years of age.
Gijtenbeek M, Haak MC, Huberts TJP, Middeldorp JM, Klumper FJCM, Slaghekke F, Lopriore E, Oepkes D, van Klink JMM.

OBJECTIVE: To investigate whether perioperative fetal hemodynamic changes in twin-twin transfusion syndrome (TTTS) are associated with neurodevelopmental impairment (NDI) at two-years. METHODS: Doppler parameters of three sonograms (day before, first day after and one week after laser surgery for TTTS) were assessed for correlation with neurodevelopmental outcome at two-years (2008-2016). NDI was defined as: cerebral palsy, deafness, blindness, and/or a Bayley-III cognitive/motor developmental test-score > 2SD below the mean. RESULTS: Long-term outcome was assessed in 492 TTTS survivors. NDI was present in 5% (24/492). After adjustment for severe cerebral injury (present in 4%), associated with NDI were: middle cerebral artery peak systolic velocity (MCA-PSV) >1.5 multiples of the median (MoM) one day after surgery (odds ratio [OR] 4.96; 95% confidence interval [CI]: 1.17-21.05, P = 0.03), a change from normal umbilical artery pulsatility index (UA-PI) pre-surgery to UA-PI >p95 post-surgery (OR 4.19; 95% CI: 1.04-16.87, P = 0.04), a change from normal to MCA-

PSV >1.5MoM (OR 4.75; 95% CI: 1.43-15.77, P = 0.01). CONCLUSION: Perioperative fetal hemodynamic changes in TTTS pregnancies treated with laser are associated with poor neurodevelopmental outcome. Prospective research on the cerebrovascular response to altered hemodynamic conditions is necessary to further understand the cerebral autoregulatory capacity of the fetus in relation to neurodevelopmental outcome. This article is protected by copyright. All rights reserved.

PMID: 32266998

18. Safety and efficacy of tranexamic acid in children with cerebral palsy undergoing femoral varus derotational osteotomy: a double cohort study.
Tzatzairis T, McMahon S, Shilpa J, Maizen C.

Eur J Orthop Surg Traumatol. 2020 Apr 6. doi: 10.1007/s00590-020-02663-w. [Epub ahead of print]

AIMS: The safety and efficacy of tranexamic acid (TXA) in reducing blood loss after total joint arthroplasty and spinal fusion surgery has been well documented. However, little data exist regarding the effectiveness of intraoperative TXA in children with cerebral palsy (CP). The aim of this double cohort study is to investigate the safety and efficacy of intraoperative TXA in reducing blood loss and transfusion requirements for children with CP undergoing a proximal unilateral or bilateral femoral varus derotational osteotomy (VDRO). PATIENTS AND METHODS: A retrospective review was performed of all paediatric theatre lists between May 2012 and January 2019 for all paediatric (< 16 years old) CP patients who underwent unilateral or bilateral VDRO combined with soft tissue release at our institution. Fifty-one patients were included in our study further subdivided into two individual groups, unilateral and bilateral VDRO. RESULTS: No statistically significant differences were found in demographics such as age, weight, ASA, GMFCS and antiepileptic medication between the groups. However, there were significant statistically differences in TBL and transfusion rates between the groups that received TXA and those that did not, both in unilateral [241 ml (TXA) vs. 369 ml (non-TXA)] and bilateral [287 ml (TXA) vs. 467 ml (non-TXA)] operations. CONCLUSION: TXA successfully reduced TBL (in both TXA subgroups) and the transfusion rates without associated complications. TXA's safety and efficacy should be explored further in adequately powered randomized controlled trials.

PMID: 32253597