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Interventions and Management

1. Does stable sitting influence upper limb function in children with cerebral palsy?
Seyhan K, Kerem-Günel M.

Turk J Pediatr. 2019;61(1):79-84. doi: 10.24953/turkjped.2019.01.012.

Bilateral spastic cerebral palsy (BSCP) patients frequently need to use various sitting devices for body control and function. The aim of this study was to investigate whether the use of a belt to position the pelvis in an adjustable chair would affect upper limb function in preschool children with BSCP. Fortyone children with BSCP [mean age 44 ±11, range 18-60 months] classified according to the Gross Motor Function Classification System (GMFCS), as level III (n=21) and level IV (n=20) were fitted with a hip-positioning belt. Upper limb functions were assessed by Quality of Upper Extremity Skills Test (QUEST). The median scores of the following upper extremity functions increased significantly by wearing the hip positioning belt: dissociated movements, grasping, weight bearing and protective extension. The total QUEST score increased from 56.7 (±46.3) to 66.1 (±39.2) (p < 0.001). The portable and adaptable hip-positioning belt may be used in daily life to improve upper limb activity in preschool children with moderate to severe BSCP.

PMID: 31559725

2. Physiologic and Pathologic Development of the Infantile and Adolescent Hip Joint: Descriptive and Functional Aspects.
Heimkes B, Wegener V, Birkenmaier C, Ziegler CM.

Semin Musculoskelet Radiol. 2019 Oct;23(5):477-488. doi: 10.1055/s-0039-1693975. Epub 2019 Sep 25.

The basic law of mechanobiology states that the external form and internal architecture of the skeleton and joints follow the functional stimuli that act upon them. Radiographs and magnetic resonance imaging reflect the loading history of the growing child, enabling an experienced radiologist to analyze the clinical functioning of patients by interpreting imaging studies. Concerning the hip joint, the physes of the coxal femoral end, the coxal femoral epiphysis with its epiphyseal growth plate, as well as the apophysis of the greater trochanter with its trochanteric growth plate, are the essential organ structures subject to internal forces. They determine the definitive geometric shape of the proximal femur. Indirectly they influence the appearance of the acetabulum and the centration of the hip joint.

PMID: 31556083

3. Percutaneous femoral shortening over a nail using on-site smashing osteotomy technique.
Jahmani R, Lovisetti G, Alorjani M, Bashaireh K.

INTRODUCTION: Closed femoral-shortening osteotomy over an intramedullary nail for the treatment of leg length discrepancy (LLD) is a demanding surgical technique, classically requiring specialized instrumentation (intramedullary saw and chisel). Herein, we describe our experience with shortening osteotomy over a nail, using a percutaneous multiple drill-hole osteotomy technique to perform the bone section with the osteotomized bone smashed and let on-site. METHOD: We operated on six patients with LLD due to: hemihypertrophy syndrome (three patients), congenital short femur, hemiplegic cerebral palsy, and growth plate injury. Mean femoral shortening was 4.2 cm. Osteotomy was performed via a multiple drill-hole technique, and femurs were stabilized using an intramedullary nail. Post-operative clinical and radiological data were recorded. Residual LLD was assessed through long-standing teleroentgenography. RESULTS: Shortening was achieved, with a final LLD of < 1 cm in all patients. All patients were satisfied and considered the lengths of the lower limbs to be equal. Our technique did not require special surgical skill or specialized instrumentation. Moreover, we did not record intraoperative and post-operative complications. DISCUSSION: Percutaneous femoral-shortening osteotomy over a nail using the on-site smashing osteotomy technique was effective and safe in treating LLD in this initial case series.

PMID: 31542823

4. Wearable sensors, cerebral palsy and gait assessment in everyday environments: is it a reality? - A systematic review.
Rozin Kleiner AF, Bellomo A, Pagnussat AS, de Athayde Costa E Silva A, Sforza C, Cicuto Ferreira Rocha NA.

This systematic review aimed to investigate emerging methods used to quantify gait parameters in children with cerebral palsy (CP) in everyday environments. The StArt computational tool automatically screened the following databases: ACM, Engineering Village, IEEE, PubMed, Scopus and Web of Science from inception to June 2018. Studies reporting the use of wearable sensors to assess gait in daily settings in children with CP were included. Data regarding 1563 studies were extracted, but only three studies could be included on the basis of the inclusion/ exclusion criteria. These studies proposed wearable technologies based on the use of signals provided by triaxial accelerometers and force resistive pressure sensors. These are able to track levels of activity and detect falls, gait deviations and gait symmetry in children with CP in their daily environments. To date, only two types of sensors have been tested in this population and it remains to be clarified how wearable sensors, used to quantify activity level, might benefit children with CP.

PMID: 31556388

5. Kinematic and Kinetic Analyses of the Vertical Jump with and without Header as Performed by Para-Footballers with Cerebral Palsy.
Reina R, Elvira JL, Valverde M, Roldán A, Yanci J.

Vertical jump is a relevant variable in the classification of football for individuals with cerebral palsy. In this regard, the literature is limited. There are no studies assessing vertical jumping ability through kinematic methods and in more specific football game situations, such as jumps with a header. The goals of the present study were to assess how the modification of jumping conditions (without and with a header) might affect the kinematic and kinetic parameters of counter movement jumping, and whether the functional profiles of the players constrain their ability to jump vertically, both with and without a header. Thirteen male football players with cerebral palsy (27.7 ± 5.7 years old) and different functional profiles participated in this study. All the players performed ten counter movement jumps with arms swing, five headed a ball and five did not. The kinematic parameters were recorded with a 3D motion analysis system, and the kinetic parameters using a force platform. Significantly smaller angles of the hips (dg = 0.75-0.79; $p < 0.01$) and knees (dg = 1.04-1.15; $p < 0.05$), as well as greater ankle extension (dg = -0.71; $p < 0.05$), were observed during the eccentric phase of the jumps with a header. There were also asymmetries between legs in ankle extension during jumps with a header (dg = -1.06; $p < 0.05$), which could be an adjustment element for the precision of the jumps (i.e., header action). It should be mentioned that the jumping pattern could be partially affected by the functional profile of football players with cerebral palsy.

PMID: 31547248

6. Defining Functional Therapy in Research Involving Children with Cerebral Palsy: A Systematic Review.
Geijen M, Ketelaar M, Sakzewski L, Palisano R, Rameckers E.

Phys Occup Ther Pediatr. 2019 Sep 26:1-16. doi: 10.1080/01942638.2019.1664703. [Epub ahead of print]

Aim: To review definitions and elements of interventions in studies, which used the word "functional" to describe their intervention for children with cerebral palsy (CP), and to determine whether definitions and elements are similar to criteria of functional therapy described in the Dutch Guidelines. Methods: Systematic review of intervention studies, which used the word "functional" to describe interventions for children with CP. We described criteria of functional therapy that were used to describe the intervention, and whether criteria were described similarly to the descriptions used in the Dutch Guidelines. Results: Of the 27 included studies, criteria "based on the activities/participation level of the ICF-CY", "goal-directed" and "context-specific" were referred to the most (40-59.3%). Descriptions of these criteria were less comparable to the suggested definition (43.8-69.2%). The remaining three criteria ("active involvement", "task-specific", and "focused on functionality instead of normality") were referred to less frequently (18.5-33.3%). The descriptions reported for these criteria were, however, the most comparable with the suggested definitions (80-100%). Conclusions: The included studies, in general have not used criteria of functional therapy. Future studies have to describe the elements of interventions in detail. Moreover, it is important to reach consensus on the definition and elements of functional therapy.

PMID: 31554456

7. [Efficacy of acupuncture for spastic cerebral palsy in infancy stage].
Zhang X, Che YP, Li HF, Yin HW, Chen T, Dong Q, Du Y.

Zhongguo Zhen Jiu. 2019 Sep 12;39(9):940-4. doi: 10.13703/j.0255-2930.2019.09.007. [Article in Chinese]

OBJECTIVE: To explore the therapeutic effect of acupuncture for spastic cerebral palsy in infancy stage. METHODS: A total of 62 children with spastic cerebral palsy were randomized into an observation group and a control group, 31 cases in each one. Both groups were given comprehensive rehabilitation therapy (sport therapy, electronic biofeedback therapy, speech cognitive training, massage therapy). On the basis of comprehensive rehabilitation therapy, the acupuncture group was treated with acupuncture at Baihui (GV 20), Sishencong (EX-HN1), motor area, Jiaji (EX-B 2), Weizhong (BL 40), Xuanzhong (GB 39), Zusanli (ST 36) and Hegu (LI 4), etc, the needles were retained for 15-20 min each time, once a day, 5 days a week, 45 days as a course with 10 days interval, a total of 3 courses were required. The Gesell development scale adaptive DQ scores, gross motor function measure (GMFM88) and muscular tension of adductor and gastrocnemius muscle were compared before and after treatment in the two groups. RESULTS: The Gesell development scale adaptive DQ score after treatment in the observation group was increased (P<0.05), there was no significant difference before and after treatment in the control group (P>0.05), the change of the observation group was larger than the control group (P<0.05). After treatment, the GMFM88 scores in the two groups were significantly increased (P<0.05), the change of the observation group was larger than the control group (P<0.05). After treatment, the muscular tension of the adductor in the two groups were decreased (P<0.05), the change of the observation group was larger than the control group (P<0.05). After treatment, the muscle tension of the gastrocnemius muscle in the two groups were decreased (P<0.05), there was no significant difference between the two groups in the variation range (P>0.05). CONCLUSION: Acupuncture combined with comprehensive rehabilitation therapy can improve cognitive function, spasticity and motor function of children with spastic cerebral palsy.

PMID: 31544381

8. Treatment response prediction of rehabilitation program in children with cerebral palsy using radiomics strategy: protocol for a multicenter prospective cohort study in west China.
Liu H, Jiang H, Wang X, Zheng J, Zhao H, Cheng Y, Tao X, Wang M, Liu C, Huang T, Wu L, Jin C, Li X, Wang H, Yang J.

Quant Imaging Med Surg. 2019 Aug;9(8):1402-1412. doi: 10.21037/qims.2019.04.04.

BACKGROUND: Cerebral palsy (CP) is a major cause of chronic childhood disability worldwide, causing activity limitation as well as impairments in sensation, cognition, and communication. Leveraging biomarkers to establish individualized predictions of future treatment responses will be of great value. We aim to develop and validate a model that can be used to predict the individualized treatment response in Children with CP. METHODS: A multicenter prospective cohort study will be conducted in 4 hospitals in west China. One hundred and thirty children with CP will be recruited and undergo clinical assessment using the Peabody Developmental Motor Scales, Manual Ability Classification System (MACS), Hand Assessment

for Infants (HAI), Assisting Hand Assessment (AHA), and Gross Motor Function Classification System (GMFCS). The data collected will include MRI image, clinical status, and socioeconomic status. The clinical information and MRI features extracted using radiomics strategy will be combined for exploratory analysis. The accuracy, sensitivity, and specificity of the model will be assessed using multiple modeling methodologies. Internal and external validation will be used to evaluate the performance of the radiomics model. DISCUSSION: We hypothesized that the findings from this study could provide a critical step towards the prediction of treatment response in children with CP, which could also complement other biomarkers in the development of precision medicine approaches for this severe disorder. TRIAL REGISTRATION: The study was registered with clinicaltrials.gov (NCT02979743).

PMID: 31559169

9. Vision-based serious games and virtual reality systems for motor rehabilitation: A review geared toward a research methodology.
Ayed I, Ghazel A, Jaume-I-Capó A, Moyà-Alcover G, Varona J, Martínez-Bueso P.

Int J Med Inform. 2019 Jul 10;131:103909. doi: 10.1016/j.ijmedinf.2019.06.016. [Epub ahead of print]

BACKGROUND: Nowadays, information technologies are being widely adopted to promote healthcare and rehabilitation. Owing to their affordability and use of hand-free controllers, vision-based systems have gradually been integrated into motor rehabilitation programs and have greatly drawn the interest of healthcare practitioners and the research community. Many studies have illustrated the effectiveness of these systems in rehabilitation. However, the report and design aspects of the reported clinical trials were disregarded. OBJECTIVE: In this paper, we present a systematic literature review of the use of vision-based serious games and virtual reality systems in motor rehabilitation programs. We aim to propose a research methodology that engineers can use to improve the designing and reporting processes of their clinical trials. METHODS: We conducted a review of published studies that entail clinical experiments. Searches were performed using Web of Science and Medline (PubMed) electronic databases, and selected studies were assessed using the Downs and Black Checklist and then analyzed according to specific research questions. RESULTS: We identified 86 studies and our findings indicate that the number of studies in this field is increasing, with Korea and USA in the lead. We found that Kinect, EyeToy system, and GestureTek IREX are the most commonly used technologies in studying the effects of vision-based serious games and virtual reality systems on rehabilitation. Findings also suggest that cerebral palsy and stroke patients are the main target groups, with a particular interest on the elderly patients in this target population. The findings indicate that most of the studies focused on postural control and upper extremity exercises and used different measurements during assessment. CONCLUSIONS: Although the research community's interest in this area is growing, many clinical trials lack sufficient clarity in many aspects and are not standardized. Some recommendations have been made throughout the article.

PMID: 31557701

10. Comparison of the development of early auditory and preverbal skills in Mandarin-Speaking children with cochlear implants with and without additional disabilities.
Zhao Y, Li Y, Long Y, Jin X, Zheng Z, Liu Y, Wang Y, Zheng J, Zhang J, Chen M, Hao J, Yang Y, Liu W, Liu H, Ni X.

Acta Otolaryngol. 2019 Sep 27:1-6. doi: 10.1080/00016489.2019.1670358. [Epub ahead of print]

Background: Few studies had assessed the auditory and preverbal skills of very young cochlear implant (CI) children with additional disabilities (AD) over a long period, especially in China. Aims/Objectives: The aim of this study was to compare the early auditory and preverbal developmental trajectories in CI children with and without AD. Material and Methods: The LittlEARS® Auditory Questionnaire (LEAQ) was employed. 29 typically developing (TD) children and 17 with AD were involved (age at implantation less than 2 years). Results: All children showed significant improvement in total LEAQ scores with CI use. Children with cerebral palsy (CP), developmental delay (DD) and white matter lesions (WML) scored lower than TD children since 3 months of CI use; a decreasing trend was observed from 24, 18 and 18 months of CI use, respectively. Children with higher nonverbal developmental quotients exhibited superior early auditory and preverbal skills. Conclusions and significance: The development of early auditory and preverbal skills among CI-using children progressed more slowly in those with AD (CP, DD or WML) than in TD children, but the differences between the two groups gradually diminished over time. Nonverbal cognitive status has a positive effect on early auditory and preverbal abilities.

PMID: 31560244

11. Utilization of a Novel Pathway in a Tertiary Pediatric Hospital to Meet the Sensory Needs of Acutely Ill Pediatric Patients.
Gupta N, Brown C, Deneke J, Maha J, Kong M.

Objective: To identify pediatric patients with sensory sensitivities during a hospital visit, and to implement a clinical pathway that can meet their sensory needs. The goal is to remove barriers to care delivery that is related to the sensory need for pediatric patients who present with an acute medical illness. Methods: The clinical pathway (identified as 'Sensory Pathway') was developed as a joint effort between key stakeholders within the community and medical providers. The pathway was conducted in a tertiary pediatric hospital from September 2016-April 2019. The main components of this pathway included- 1. Staff training; 2. Provision of sensory toolkits and story board; 3. Early collaboration with allied professionals; and 4. Early and continuous parental involvement. The Sensory Pathway was implemented first in the emergency department, followed by inpatient units. Patients triggered the pathway through caregiver or staff identification. Demographic of patients who triggered the pathway was extracted. A detailed qualitative analysis of any parents' feedback received was performed. Results: A cohort of patients with sensory needs was identified amongst pediatric patients who presented to the hospital with an acute illness. The most common comorbidity associated with sensory sensitivity/need was Autism Spectrum Disorder (48%), followed by cerebral palsy (22.8%) and Attention-Deficit/Hyperactivity Disorder (16%). 1337 patients (51.8%) had a single comorbidity while 45.9% patients had more than one comorbidity. Only 1.3% patients had a known diagnosis of sensory processing disorder. The pathway was triggered in 2,580 patient visits with 1643 patients and 937 repeat visits. The vast majority of patients who triggered the pathway had a medical presenting complaint (vs. behavioral). The following themes emerged from the parents' feedback: 1. Additional help received specific to the child's sensory needs; 2. Feeling of comfort; and 3. Improved overall experience. Conclusion: The Sensory Pathway identified a unique profile of pediatric patients who have sensory needs during their hospital stay. The pathway was successfully implemented for children with sensory need in our hospital across a wide range of demographic and with varied medical illness.

PMID: 31555627

12. Development curves of communication and social interaction in individuals with cerebral palsy.
Tan SS, van Gorp M, Voorman JM, Geytenbeek JJ, Reinders-Messelink HA, Ketelaar M, Dallmeijer AJ, Roebroeck ME; Perrin-Decade study group.

AIM: To determine development curves of communication and social interaction from childhood into adulthood for individuals with cerebral palsy (CP). METHOD: This Pediatric Rehabilitation Research in the Netherlands (PERRIN)-DECADE study longitudinally assessed 421 individuals with CP, aged from 1 to 20 years at baseline, after 13 years (n=121 at follow-up). Communication and social interactions were assessed using the Vineland Adaptive Behavior Scales. We estimated the average maximum performance limit (level) and age at which 90% of the limit was reached (age90) using nonlinear mixed-effects modeling. RESULTS: One-hundred individuals without intellectual disability were aged 21 to 34 years at follow-up (39 females, 61 males) (mean age [SD] 28y 5mo [3y 11mo]). Limits of individuals without intellectual disability, regardless of Gross Motor Function Classification System (GMFCS) level, approached the maximum score and were significantly higher than those of individuals with intellectual disability. Ages90 ranged between 3 and 4 years for receptive communication, 6 and 7 years for expressive communication and interrelationships, 12 and 16 years for written communication, 13 and 16 years for play and leisure, and 14 and 16 years for coping. Twenty-one individuals with intellectual disability were between 21 and 27 years at follow-up (8 females, 13 males) (mean age [SD] 24y 7mo [1y 8mo]). Individuals with intellectual disability in GMFCS level V showed the least favourable development, but variation between individuals with intellectual disability was large. INTERPRETATION: Individuals with CP and without intellectual disability show developmental curves of communication and social interactions similar to typically developing individuals, regardless of their level of motor function. Those with intellectual disability reach lower performance levels and vary largely in individual development. WHAT THIS PAPER ADDS: Communication and social interactions in individuals with cerebral palsy without intellectual disability develop similarly to typically developing individuals. Communication and social interactions of individuals with intellectual disability develop less favourably and show large variation.

PMID: 31541474

13. Recognizing and documenting undernutrition in hospitalized children with cerebral palsy.
Aumar M, Gottrand F.

Dev Med Child Neurol. 2019 Sep 21. doi: 10.1111/dmcn.14362. [Epub ahead of print]

PMID: 31541461

14. Applications of advanced signal processing and machine learning in the neonatal hypoxic-ischemic electroencephalogram.
Abbasi H, Unsworth CP.

Neural Regen Res. 2020 Feb;15(2):222-231. doi: 10.4103/1673-5374.265542.

Perinatal hypoxic-ischemic-encephalopathy significantly contributes to neonatal death and life-long disability such as cerebral palsy. Advances in signal processing and machine learning have provided the research community with an opportunity to develop automated real-time identification techniques to detect the signs of hypoxic-ischemic-encephalopathy in larger electroencephalography/amplitude-integrated electroencephalography data sets more easily. This review details the recent achievements, performed by a number of prominent research groups across the world, in the automatic identification and classification of hypoxic-ischemic epileptiform neonatal seizures using advanced signal processing and machine learning techniques. This review also addresses the clinical challenges that current automated techniques face in order to be fully utilized by clinicians, and highlights the importance of upgrading the current clinical bedside sampling frequencies to higher sampling rates in order to provide better hypoxic-ischemic biomarker detection frameworks. Additionally, the article highlights that current clinical automated epileptiform detection strategies for human neonates have been only concerned with seizure detection after the therapeutic latent phase of injury. Whereas recent animal studies have demonstrated that the latent phase of opportunity is critically important for early diagnosis of hypoxic-ischemic-encephalopathy electroencephalography biomarkers and although difficult, detection strategies could utilize biomarkers in the latent phase to also predict the onset of future seizures.

PMID: 31552887

15. Erythropoietin-induced cluster of seizures in two children with cerebral palsy.
Tatlı B, Bozgan D, Ekici B, Gürbüzer CA.

Acta Neurol Belg. 2019 Sep 25. doi: 10.1007/s13760-019-01207-2. [Epub ahead of print]

PMID: 31555981

16. Vagus Nerve Stimulation in Rodent Models: An Overview of Technical Considerations.
Noller CM, Levine YA, Urakov TM, Aronson JP, Nash MS.

Front Neurosci. 2019 Sep 4;13:911. doi: 10.3389/fnins.2019.00911. eCollection 2019.

Over the last several decades, vagus nerve stimulation (VNS) has evolved from a treatment for select neuropsychiatric disorders to one that holds promise in treating numerous inflammatory conditions. Growing interest has focused on the use of VNS for other indications, such as heart failure, rheumatoid arthritis, inflammatory bowel disease, ischemic stroke, and traumatic brain injury. As pre-clinical research often guides expansion into new clinical avenues, animal models of VNS have also increased in recent years. To advance this promising treatment, however, there are a number of experimental parameters that must be considered when planning a study, such as physiology of the vagus nerve, electrical stimulation parameters, electrode design, stimulation equipment, and microsurgical technique. In this review, we discuss these important considerations and how a combination of clinically relevant stimulation parameters can be used to achieve beneficial therapeutic results in pre-clinical studies of sub-acute to chronic VNS, and provide a practical guide for performing this work in rodent models. Finally, by integrating clinical and pre-clinical research, we present indeterminate issues as opportunities for future research.

PMID: 31551679

17. Preterm Perinatal Hypoxia-Ischemia Does not Affect Somatosensory Evoked Potentials in Adult Rats.
Barkhuizen M, Vles JSH, van Mechelen R, Vermeer M, Kramer BW, Chedraui P, Bergs P, van Kranen-Mastenbroek VHJM, Gavilanes AWD.

Somatosensory evoked potentials (SSEPs) are a valuable tool to assess functional integrity of the somatosensory pathways and for the prediction of sensorimotor outcome in perinatal injuries, such as perinatal hypoxia-ischemia (HI). In the present research, we studied the translational potential of SSEPs together with sensory function in the male adult rat with perinatal HI compared to the male healthy adult rat. Both somatosensory response and evoked potential were measured at 10-11 months after global perinatal HI. Clear evoked potentials were obtained, but there were no group differences in the amplitude or latency of the evoked potentials of the preceding sensory response. The bilateral tactile stimulation test was also normal in both groups. This lack of effect may be ascribed to the late age-of-testing and functional recovery of the rats.

PMID: 31540369

18. Prevalence and Trends of Developmental Disabilities among Children in the United States: 2009-2017.
Zablotsky B, Black LI, Maenner MJ, Schieve LA, Danielson ML, Bitsko RH, Blumberg SJ, Kogan MD, Boyle CA.

OBJECTIVES: To study the national prevalence of 10 developmental disabilities in US children aged 3 to 17 years and explore changes over time by associated demographic and socioeconomic characteristics, using the National Health Interview Survey. METHODS: Data come from the 2009 to 2017 National Health Interview Survey, a nationally representative survey of the civilian noninstitutionalized population. Parents reported physician or other health care professional diagnoses of attention-deficit/hyperactivity disorder; autism spectrum disorder; blindness; cerebral palsy; moderate to profound hearing loss; learning disability; intellectual disability; seizures; stuttering or stammering; and other developmental delays. Weighted percentages for each of the selected developmental disabilities and any developmental disability were calculated and stratified by demographic and socioeconomic characteristics. RESULTS: From 2009 to 2011 and 2015 to 2017, there were overall significant increases in the prevalence of any developmental disability (16.2%-17.8%, $P < .001$), attention-deficit/hyperactivity disorder (8.5%-9.5%, $P < .01$), autism spectrum disorder (1.1%-2.5%, $P < .001$), and intellectual disability (0.9%-1.2%, $P < .05$), but a significant decrease for any other developmental delay (4.7%-4.1%, $P < .05$). The prevalence of any developmental disability increased among boys, older children, non-Hispanic white and Hispanic children, children with private insurance only, children with birth weight ≥ 2500 g, and children living in urban areas and with less-educated mothers. CONCLUSIONS: The prevalence of developmental disability among US children aged 3 to 17 years increased between 2009 and 2017. Changes by demographic and socioeconomic subgroups may be related to improvements in awareness and access to health care.

PMID: 31558576

19. The Prevalence Pattern of Locomotor Disability and its Impact on Mobility, Self-Care, and Interpersonal Skills in Rural Areas of Jodhpur District.
Mishra K, Siddharth V, Bhardwaj P, Elhence A, Jalan D, Raghav P, Mahmood SE.

CONTEXT: Impact of disability is deleterious, affecting an individual's every aspect. Majority of disabled reside in rural areas of developing countries. Moreover, different types of disability add to its wide spectrum. All these make it a major health issue. AIMS: The aim of this study was to note the prevalence rate and pattern of locomotor disability in a rural population of Jodhpur District and to observe its impact on mobility, self-care, and interpersonal skills of disabled. SETTINGS: This study was carried out in rural field practice area of the Community and Family Medicine Department of tertiary care setup. DESIGN: This was a cross-sectional study. MATERIALS AND METHODS: House-to-house survey for a sample size of 1656 was conducted by a team of trained doctors, therapists, and anganwadi workers for identification of locomotor disability applying a pretested survey questionnaire. STATISTICAL ANALYSIS: SPSS version 22 was used for descriptive analysis of variables (frequency distribution), and the Chi-squared test was used for the association of sociodemographic factors with performance qualifier score. RESULTS: The prevalence rate of 2.08% for locomotor disability (male = 57% and female = 43%) was noted, with 31% from 40 to 60 years, 49% were illiterate, and 60% were from lower class. The main etiologies were cerebrovascular accident (25%) and cerebral palsy (23%). About 80% faced some difficulties in mobility domain, 57% in self-care, and 63% in

interpersonal skills. Statistically significant association was seen for self-care domain with education level (P = 0.04) and for interpersonal skill domain with age groups and diagnosis (P = 0.022 and P = 0.035, respectively). CONCLUSION: The overall prevalence of locomotor disability in rural Jodhpur was 2.08%, higher for males and higher from 40 to 60 years. Most disabled were illiterate and were from low socioeconomic status. Self-care, mobility, and interpersonal skills were primarily affected and require proper intervention.

PMID: 31543569

20. From movement to action: a new framework for cerebral palsy.
Ferrari A.

Eur J Phys Rehabil Med. 2019 Sep 24. doi: 10.23736/S1973-9087.19.05845-3. [Epub ahead of print]

The interpretation of Cerebral Palsy (CP) is closely linked to points of view that are no longer acceptable: - the idea that it is primarily a motor problem (posture and movement disorder), - the idea that it is only a central (cerebral) pathology, - the idea that it is a non-progressive disease (fixed encephalopathy). Actually, the problems that contribute to producing the CP clinical picture are several and complex. First of all, building of the action, starting from subject motivation, through motor imagery and subsequent project elaboration. Sequentially, executive planning, disorder often hidden under the most remarkable alteration of motor patterns and muscle tone. Finally, realization, conditioned by the idea that the locomotor apparatus is only and always the victim of an incapable central nervous system. Little known and very neglected perceptive components can contribute to compromising subject motor control. The influences that primitive changes of musculoskeletal system, often depending on site, nature, size and time of the lesion, exert on the possible choices of the central nervous system are often overlooked. Peripheral structures can in fact modify considerably the expression of palsy (understood as the form of adaptive functions) primitively. At least six different sources of error can be identified in the cerebral palsied child. For a rehabilitative intervention with greater possibilities of effectiveness, it is necessary to recognize and evaluate each of them. Especially as regards the prevention of secondary deformities, the responsibility attributed to physiotherapy must be re-evaluated.

PMID: 31556512

21. Women's Preferences for Maternal and Neonatal Morbidity and Mortality in Childbirth.
Tucker Edmonds B, McKenzie F, Downs SM, Carroll AE.

Med Decis Making. 2019 Sep 26:272989X19869910. doi: 10.1177/0272989X19869910. [Epub ahead of print]

Purpose. To measure utility values that describe women's willingness to tradeoff maternal morbidity for fetal benefit among pregnant and nonpregnant women of reproductive age. Methods. We recruited English-speaking women aged 18 to 45 years in clinical and community-based settings. Eight health states were studied: 4 maternal (healthy, stroke, hysterectomy, death) and 4 neonatal (healthy, severe cerebral palsy [CP], severe mental retardation [MR], death). Utilities were assessed on a subset of 9 pairs of mom/baby delivery outcomes. Participants ranked the 9 pairs of outcomes in order of preference, then standard gamble methods were used to calculate utilities. Numeracy skills were assessed. Results. Utilities were obtained from 477 participants (recruitment rate = 94%). Twenty-one percent were pregnant, 63% were parents, and 54% were African American. Utilities did not differ significantly between pregnant and nonpregnant women or based on numeracy score. The highest (nonhealthy) values were assigned to baby healthy/mom hysterectomy (0.999), baby healthy/mom stroke (0.946), and baby CP/mom healthy (0.940). The lowest values were assigned to baby death/mom hysterectomy (0.203), baby MR/mom death (0.150), and baby death/mom stroke (0.087). Nonwhite participants assigned a significantly higher value to baby MR/mom death (P = 0.01), baby MR/mom stroke (P = 0.02), baby MR/mom healthy (P < 0.01), and baby MR/mom hysterectomy (P = 0.02) than white participants. Conclusion. When asked to value pairs of maternal/fetal outcomes that required a tradeoff of morbidity and mortality, women tended to assign the highest utility to combinations that resulted in a "healthy baby." They assigned the lowest values to combinations that resulted in a baby's death or MR. Our findings highlight the importance of 1) assessing individual preferences and goals of care for pregnancy outcomes and 2) measuring utilities among reproductive-aged women when modeling obstetric decision making.

PMID: 31556790

Prevention and Cure

22. Genome-Wide Alteration of 5-Hydroxymethylcytosine in Hypoxic-Ischemic Neonatal Rat Model of Cerebral Palsy.
Zhang Y, Zhang Y, Chen D, Wang C, Chen L, Gao C, Fan W, Shi J, Zhang J, Li B.

Cerebral palsy (CP) is a neurodevelopmental disorder usually occurring early in life and persisting through the whole life. Several risk factors, including perinatal hypoxia-ischemia (HI), may contribute to occurrence of CP in preterm infants. DNA hydroxymethylation has been shown to play an important role in neurodevelopment and neurodegenerative disorders. However, the effect of DNA hydroxymethylation in CP remains unknown. The aim of this study is to explore whether and how DNA hydroxymethylation is involved in CP pathogenesis. We observed that overall 5-hydroxymethylcytosine (5hmC) abundance in the cortex of the temporal lobe of rat pups was decreased significantly after hypoxic-ischemic injury, and the reduced expression of Tet1 and Tet2 enzymes might be responsible for this change. Identified differential hydroxymethylation regions (DhMRs) were richly involved in multiple signaling pathways related to neuronal development and function. Furthermore, we found that reduced 5hmC modification on the DhMRs-related genes were accompanied by decrease of their mRNA expression levels. These results suggest that 5hmC modifications are involved in the CP pathogenesis and may potentially serve as a new therapeutic target.

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